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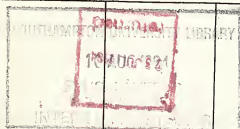


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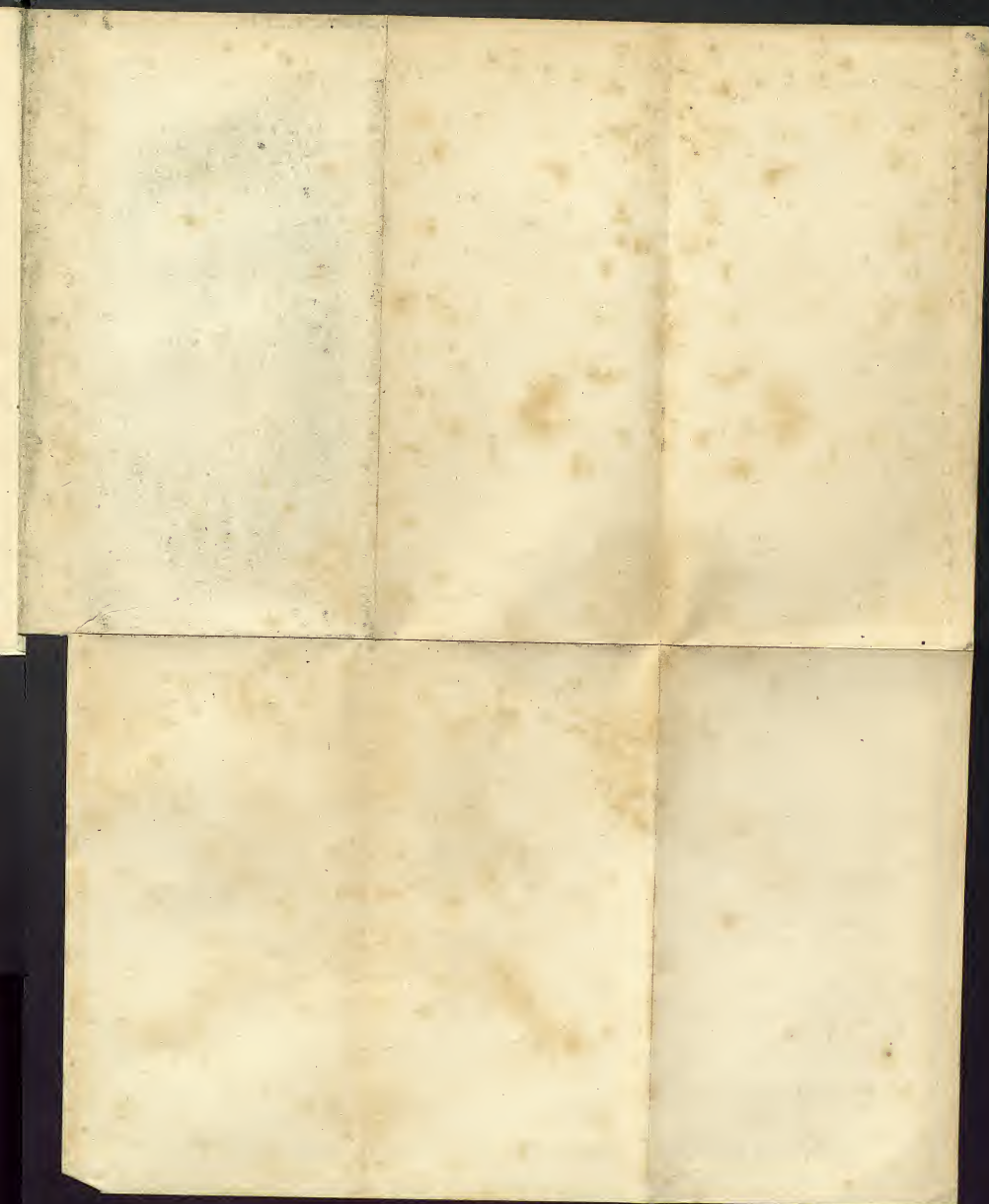
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BRITISH  
SHEEP FARMING

BY  
WILLIAM BROWN  
FACTOR AND ESTATE AGENT

EDINBURGH  
ADAM AND CHARLES BLACK  
1870

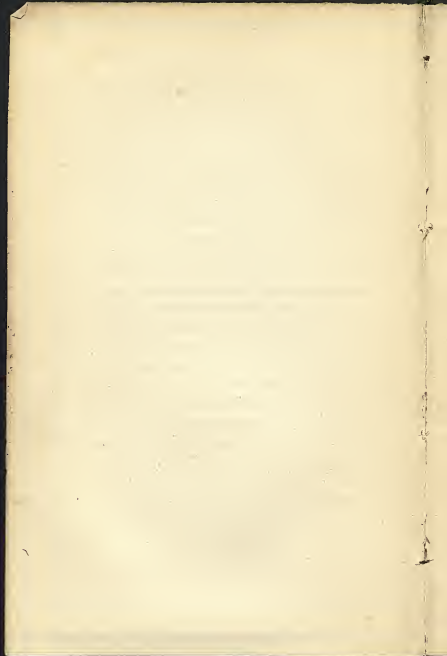


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TO  
LIEUT.-COL. JAMES ROSS FARQUHARSON,  
OF INVERGAULD, BRAEMAR,  
WHOSE URBANITY AND INTEGRITY AS A LANDLORD  
HAVE WON FOR HIM MANY FRIENDS,  
AND  
WHOSE INDULGENCES TO ME DURING THE TEN YEARS I HAD  
THE HONOUR OF MANAGING HIS EXTENSIVE ESTATES  
CAN NEVER BE FORGOTTEN,  
THIS HANDY-BOOK  
TO THE SCIENCE AND PRACTICE OF BRITISH SHEEP FARMING  
IS RESPECTFULLY DEDICATED BY  
HIS FAITHFUL SERVANT  
THE AUTHOR.

EDINBURGH, March 1870.



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## PREFACE.

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I AM not aware that we have, in any form, a handy book, or guide to the sheep and sheep-grazings of this country—for the stranger as well as ourselves. It is not so much the practical details of everyday management that is needed, as guidance as to where, and in what circumstances, we find the genus *Ovis aries* in the British Isles. The majority of our farmers yet require to know the *principles* upon which their flocks are managed.

Besides various papers in agricultural works and periodicals, there are several volumes specially devoted to sheep-husbandry; but, valuable as these in many respects are, they fail to meet what seem to me the particular wants of the case. From Hogg's *Shepherd's Guide* in 1807, to *Youatt* in 1869, the unvarying programme has been—history, anatomy, diseases, and local management.

In the present work I propose to take up this department of agriculture as we find it developed by physical influences and the hand of man ; or its position, principles, and practice. The habitats, and the prevalent breeds of sheep adapted to them, will naturally arrange the division of the work ; and while all conclusions are based on facts—which, as a rule, require little more than setting down in plain form—allowance will be made, I trust, for any tautology where much variety of one subject has to be dealt with.

In some respects this work is necessarily a compilation, and I have therefore to acknowledge obligations for information from various sources.

## CHAPTER I.

### GENERAL PHYSICAL CHARACTERISTICS OF THE BRITISH ISLES.

To the world the map gives the British Isles as a small green spot, an equilateral triangle of some 500 miles on the side. To the British flockmaster two-thirds of these 77,000,000 acres—while nothing more than a few very extensive runs in South America—are fields of gold in wool and mutton; and to the man of science they possess a variety of interesting and instructive physical characteristics which probably do not exist within a similar extent in any other part of the world. The south latitude of  $50^{\circ}$  ripens the vine, the  $60^{\circ}$  of northern limit give almost nothing but heath and seaweed as pasture,\* while in the mountain corries snow lies throughout the year.

It will be best to notice briefly in succession the principal features that affect our subject.

\* The Orkney sheep feed on seaweed, more probably from choice than necessity, as it is eminently nutritive.



## 1. SOILS GEOLOGICALLY.

It is also a peculiar fact that not only within the area of Great Britain, but even in some of its counties individually, the geological formations are presented in greater variety than occurs in very much more extensive districts elsewhere. As rocks make soils primarily, and their position and chemical nature give distinctive character to vegetation, it is evident that the geological nature of a country must materially affect even its surface value, and that in no respect so much as in regard to the grasses. The prevailing groups requiring notice are the limestone, sandstone, and granitic; and these three regulate in a great measure the soils of the British Isles. I adopt these common names for the series of rocks of which they are typical, in order to their being easily understood by the general reader, as no strictly scientific classification is here necessary.

First, we have the limestone (and chalk) of the south and north of England and centre of Ireland, producing its loamy, light, and absorbent soils in rounded hills; then sandstone in the middle of England and south of Scotland and Ireland, with stiff retentive soils, either of local or foreign origin, on plains and terraces; and the granitic rocks in

the north of Scotland, Ireland, and Wales, with soils of a thin, cold nature, on broad and peaky mountains.

## 2. NATURAL DRAINAGE.

Each of these groups being characterised by its own configuration, the river-drainage of course follows the specialties of each; and a sketch of mountain ranges with relative drainage is indispensable to a description of the country in respect of any branch of agriculture, but especially that of grazings. The following table shows the various lines of drainage-fall, the principal rivers and mountains in each of the soil-divisions as arranged, and the area drained to the east, west, north, and south :—

Districts.	Mountain Ranges, with heights in feet.	Principal Rivers.	Area in Acres of				Total.
			East Fall.	West Fall.	North Fall.	South Fall.	
South of England	Downs 2100	Taw, Exe, Parret, Stour, Downs, Test, Thames, Medway, Blackwater, Ouse, and Yare	4,608,000	1,792,000	2,560,000	4,032,000	12,992,000
North of England	Cumberland 3200, and Cheviots 2750	Trent, Mersey, Witham, Humber, Ribble, Ouse, Lune, Tees, Wear, Eden, and Tyne	1,792,000	8,200,000	1,920,000	8,840,000	10,752,000
Centre of Ireland	Slieve 1700, Keeper 2300, and Lugna- quilla 3050	Erne, Moy, Galway, Shannon, Boyle, Liffey, Slaney, Barrow, Black- water, Lee, and Feale	1,280,000	8,840,000	1,408,000	5,248,000	11,776,000
Middle of England	Pennine 2900	Trent, Witham, Welland, Severn, Wye, Towy, Usk, Dee	1,920,000	640,000	...	4,992,000	7,552,000
South of Scotland	Cheviot 2750, Low- ther 2650, and Lammermuir 1750	Tweed, Esk, Nith, Clyde, Forth, and Tay	1,600,000	1,408,000	640,000	1,792,000	5,440,000
South of Ireland	MacGillivuddy's Reeks 3400, and Knockmealdown 2600	Lee, Blackwater, Feale, and Barrow	1,280,000	1,088,000	...	1,728,000	4,096,000
North of Scotland	Ross-shire 4000, and Grampians 4400	Tay, Dee, Don, Lochy, Spey, Deveron, Findhorn, Ness, Beauly, Conan	5,248,000	6,080,000	1,984,000	1,280,000	14,592,000
North of Ireland	Carntocher 2250	Bann and Foyle . . .	192,000	640,000	3,520,000	...	4,352,000
North of Wales	Snowdon 3600	Dee and Severn . . .	...	1,280,000	1,280,000	512,000	3,072,000
			17,920,000	19,968,000	13,312,000	23,424,000	74,624,000

## ABSTRACT.

	East.	West.	North.	South.	Totals.
England	8,320,000	6,910,000	5,760,000	13,376,000	34,368,000
Scotland	6,848,000	7,488,000	2,624,000	3,072,000	20,032,000
Ireland	2,752,000	5,568,000	4,928,000	6,976,000	20,224,000

This division of the kingdom into the cardinal points, and according to the outlets of the river-drainage, while most natural, is also best for reference. It will be observed that the main drainage of England is southwards; that of Scotland westwards; and of Ireland southwards. As a whole, the water of the British Isles has a greatest south fall, and least to the north. The east and west tendencies are, for all practical purposes, about equal. It is rather remarkable that Scotland has the least north run; all the mountains range more or less in a north-east and south-western line.

## 3. TEMPERATURE.

Taking into account the fact that 350 feet above sea-level lowers the temperature by one

degree, we can understand how a difference of a few hundred feet of elevation would materially change, not only the climate, but many other aspects of the country. Our geographical position is such that an addition of 600 or 700 feet to the highest mountains would bring them within the line of perpetual snow. This, and the "*lie*" of the land, the kinds and amount of vegetation, principally decide the nature of local climate. The insular position of the British Isles, and their possession of high lands, give them a variety of temperature at once characteristic and remarkable. It will suffice to follow the order of drainage given, and ascertain the mean of the seasons by the leading geological or soil groups and their drainage. On tabulating these carefully, as I have had occasion to do for this chapter, there is presented another remarkable result in the gross average of each district being exactly alike for the east and west divisions of the country, though the mean of each district or locality varies much in some cases. For example, the summer mean of the east ranges from 57° in the north of Scotland to 63° in the south of England and Ireland; and a difference of not less than 9° (though the records in the north-west of Scotland are not very reliable) exists in the

summer mean of the north of Scotland and the south of England, being  $55^{\circ}$  and  $64^{\circ}$  respectively. Again, we have a range of winter mean from  $37^{\circ}$  in the north of England and south and north of Scotland, to  $43^{\circ}$  in the centre and south of Ireland, for the east division, and no less in the west than from  $35^{\circ}$  in the south of Scotland, to  $42^{\circ}$  in the middle of England. Ireland being as yet but poorly represented in meteorological tables, a full and satisfactory summary for that division is not attainable, but enough is given to show the general mildness, and, we may add, humidity of that country.

We have, then, in these data evidence that the temperature of the British Isles is, as a whole, regularly distributed, though locally very variable.

#### 4. RAINFALL.

This is another element of climate, perhaps the most important to the grazier as regards the choosing ground for sheep, and even for a particular class of them. Grass, of all vegetation, and on special soils, is soonest affected by drought on the one hand, and abundance of rain on the other. The rainfall of the principal localities of this

country is now calculated with a degree of accuracy that may be generally relied on; yet, as the amount is influenced, as we find it is, more by *local* than by outside causes, the collection of data regarding it is still a matter of great importance, and too many stations cannot be engaged in the work.

There is no connection whatever betwixt registration of large annual rainfall and a humid climate; and in this respect the purely practical man is apt to be misled. Some of the most arid parts of the world can show the greatest amount of fall, but this fall is generally comprised within a very short period of the year, and often does more mischief than good. It is the regularly distributed rain—the fine weekly or bi-weekly showers—that the grazier can alone build upon for success in raising wool and mutton. Arranging the data on this head in the same way as we did for temperature—that is, in the nine divisions, and according to drainage by the cardinal points—the results keep true to the peculiarities of each district. In the south of England the least rainfall is in the divisions draining to the north, and the greatest in those draining to the south; while in the middle it is least on the east and greatest on the west; and for the north of



England it is equal for the north and south drainage, and greatest on the west. In Scotland we have first for its southern division a least rainfall by the north drainage, and most by the south fall; and in the northern division it is very distinct, as least in the north run and greatest also on the west. Ireland, again, is represented in the centre by a least fall in eastern drainage, and greatest on the west; and this is also the same for the north and south divisions.

As a whole, it is shown that the least rainfall is on the land having an eastern drainage; about equal by north and south, and very much larger by the west.

But, on the question of temperature and rainfall, before meteorological data can be of practical value to the husbandman, mean *monthly* tables are required, not for large areas but for localities characterised by distinct geographical peculiarities as unvarying as possible, so that a long series of observations would be applicable for a number of years. I am glad to learn from Mr. Buchan, the able Secretary of the Scottish Meteorological Society, that this is one of the directions being at present given to observations in the British Isles. How very valuable even would it be to

## 12 GENERAL PHYSICAL CHARACTERISTICS

have tables similar to the following for all the counties :—

COUNTY.	MEAN RAINFALL.												
	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.	
Aberdeen .	2.75	1.76	2.88	1.87	1.53	2.98	2.66	3.03	2.74	3.37	3.46	3.59	
Haddington	2.49	1.72	2.69	2.43	1.83	3.05	3.06	2.49	3.18	3.57	3.52	2.79	
Perth .	3.54	1.70	2.77	1.83	2.04	3.36	3.55	3.14	3.04	3.16	2.94	3.34	
Roxburgh .	2.57	1.77	2.26	0.97	1.21	2.22	1.88	2.25	1.75	2.70	2.40	2.24	
Sutherland .	3.70	1.82	2.95	1.73	1.57	2.22	2.93	2.60	2.25	3.78	2.99	3.17	

COUNTY.	MEAN TEMPERATURE.												
	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.	
Aberdeen .	34	35	37	40	48	55	55	54	50	44	37	36	
Haddington	37	38	41	43	50	56	57	58	51	49	41	38	
Perth .	36	37	40	43	50	57	57	57	53	47	39	37	
Roxburgh .	36	37	39	42	49	56	56	56	51	46	37	36	
Sutherland .	38	39	40	43	48	54	56	56	53	47	41	40	

An abstract of mean monthly rainfall and temperature for the kingdom, so far as I can get



## CHAPTER II.

## THE GRAZINGS OF BRITAIN.

Showing Cultivated and Unreclaimed Lands, Number and Prevailing Kinds of Sheep, with Mean Annual Rainfall and Temperature for each County.

PASTURES may first be classed under two grand heads—the natural and the cultivated—those never sown by man, and those laid out solely by him. A common subdivision of these is into lowland, upland, and hills—embracing less and less cultivation respectively, till on the higher hills and mountains, from say 1500 feet upwards, the pasture is altogether natural, and some beyond grass growth. The grazings of Britain will however be better divided into *cultivated*, *reclaimed*, and *natural*, as this arrangement will not only lead us from lower to higher grounds, but is also otherwise more systematic and suitable to the subject in hand. By cultivated pasture is meant that portion of arable directly in connection with the rotation of cropping, and it is therefore seldom

more than three years old; by reclaimed or permanent pasture is understood that which was once arable under rotation, and that also which has been purposely improved, and both now laid under what is usually called "permanent" grass; and natural pasture is of course that which has received little or no attention at the hands of man.

Adopting this classification, I give a tabular statement of the British Isles, showing the several lands for every county, and number and prevalent kinds of sheep in each. The figures are an average of the Government statistics for 1867 and 1868. Advantage has been taken of this list of counties, to give columns of mean annual temperature and rainfall, wherever the correctness of these can be relied on.

# ENGLAND.

County.	Cultivated Acres.	Reclaimed and Permanent Pasture.	Unreclaimed Lands.	Total Area.	Prevailing kinds of Sheep.	Total Number of Sheep.	Mean Annual.	
							Temperature.	Rain-fall.
Bedford . . .	175,000	72,000	47,582	295,582	Leicesters and Downs	195,000	42	22
Berks . . .	248,500	103,000	94,710	451,210	Downs and Leicesters	347,000	50	22
Buckingham . . .	206,000	182,000	78,932	466,932	Leicesters and Downs	353,000	49	25
Cambridge . . .	395,000	73,000	57,182	525,182	"	334,000	...	36
Chester . . .	181,000	814,000	212,078	707,078	Leicesters and Cheviots	232,000	49	40
Cornwall . . .	355,000	121,000	397,600	873,600	Leicesters	423,000	53	141
Cumberland . . .	276,000	240,000	485,273	1,001,273	Blackfaced and Cheviots	520,000	48	26
Derby . . .	151,000	329,000	178,803	658,803	Leicesters, Downs, and Cheviots	268,000	48	31
Devon . . .	650,000	350,000	657,180	1,657,180	Leicesters	910,000	51	22
Dorset . . .	222,000	209,000	201,025	632,025	Downs	520,000	49	23
Durham . . .	206,000	187,000	229,476	622,476	Leicesters and Cheviots	215,000	46	31
Essex . . .	625,000	163,000	272,549	1,060,549	Downs	480,000	50	28
Gloucester . . .	327,000	285,000	193,102	805,102	Leicesters	483,000	50	50
Hants . . .	531,000	148,000	391,216	1,070,216	Downs	620,000	49	28
Hertford . . .	194,000	209,000	131,823	534,823	"	365,000	49	26
Hertford . . .	241,000	89,000	61,141	391,141	"	220,000	49	50
Huntingdon . . .	150,000	55,000	24,544	229,544	Leicesters	163,000	49	26
Kent . . .	429,000	291,000	319,419	1,039,419	Downs	1,100,000	50	

Lancaster . . .	228,000	492,000	499,221	1,219,221	Leicesters, Blackfaced, and, Cheviots	331,000	49	52
Leicester . . .	177,000	274,000	63,164	514,164	Leicesters	465,000	48	27
Lincoln . . .	1,013,000	402,000	360,457	1,775,457	Leicesters and Downs	1,648,000	49	22
Middlesex . . .	34,000	74,000	72,136	186,136	Downs . . .	48,000	51	21
Monmouth . . .	84,000	128,000	156,390	388,399	Welsh and Leicesters	193,000		
Norfolk . . .	824,000	213,000	317,301	1,354,301	Downs . . .	831,000	49	27
Northampton . . .	271,000	264,000	95,358	630,358	Leicesters	570,000	...	22
Northumberland . . .	315,000	346,000	588,299	1,249,299	Cheviots and Leicesters	910,000	45	
Nottingham . . .	282,000	147,000	97,076	526,076	Leicesters . . .	335,000	49	24
Oxford . . .	267,000	133,000	72,717	472,717	" . . .	378,000	48	22
Rutland . . .	42,000	35,000	18,805	95,805	" . . .	110,000	...	25
Salop . . .	317,000	330,000	179,055	826,055	Leicesters and Downs	509,000	50	26
Somerset . . .	285,000	490,000	272,220	1,047,220	" . . .	752,000		
Stafford . . .	230,000	340,000	158,468	728,468	" . . .	362,000		
Suffolk . . .	603,000	140,000	204,681	947,681	Downs . . .	553,000		
Surrey . . .	182,000	95,000	199,792	498,792	" . . .	121,000		
Sussex . . .	386,000	243,000	307,911	936,911	" . . .	580,000	49	33
Warwick . . .	238,000	223,000	102,946	563,946	Leicesters	403,000		
Westmoreland . . .	57,000	164,000	264,432	485,432	Blackfaced . . .	386,000		
Wills . . .	417,000	290,000	158,092	865,092	Downs and Leicesters	755,000	50	30
Worcester . . .	202,000	176,000	94,165	472,165	Leicesters	270,000	...	30
York . . . { N. E. W. }	406,000	374,000	570,121	1,350,121	Blackfaced and Leicesters	731,000	48	31
	468,000	150,000	185,139	771,139	Leicesters	576,000		
	478,000	658,000	573,307	1,709,307	Leicesters and Blackfaced	819,000		



# WALES.

County.	Cultivated Acres.	Reclaimed and Permanent Pasture.	Uncultivated Lands.	Total Area.	Prevailing kinds of Sheep.	Total Number of Sheep.	Mean Annual	
							Temperature.	Rain-fall.
Anglesey .	76,000	57,000	60,458	193,458	Welsh	51,000		
Brecon .	66,000	112,000	282,158	460,158	"	845,000		
Cardigan .	118,000	116,000	208,387	443,387	"	160,000	49	
Cardiff .	141,000	235,000	230,331	606,331	"	181,000	50	
Carmarthen .	78,000	96,000	201,273	370,273	"	180,000		
Carmarvon .	129,000	110,000	127,052	386,052	"	222,000		
Denbigh .	66,000	51,000	67,905	184,905	"	61,000	49	
Flint .	86,000	164,000	297,494	547,494	"	250,000		
Glamorgan .	45,000	82,000	258,291	385,291	"	328,000		
Merioneth .	101,000	130,000	252,323	483,323	"	297,000		
Montgomery .	113,000	148,000	140,691	401,691	"	105,000	51	
Pembroke .	44,000	93,000	135,128	272,128	"	259,000		
Radnor .								

# SCOTLAND.

Aberdeen .	534,000	24,000	702,625	1,260,625	Blackfaced and Cheviot	172,000	44	33
Argyle .	62,000	58,000	1,968,126	2,083,126	Blackfaced	920,000	49	54
Ayr .	170,000	125,000	440,262	735,262	Cheviot and Blackfaced	341,000	48	48
Banff .	147,000	8,000	284,219	439,219	"	65,000	...	26
Berwick .	152,000	33,000	117,951	302,951	Blackfaced and Cheviot	277,000	47	31

Bute . . .	15,000	6,000	88,375	109,375	Blackfaced	38,000	48	37
Caithness . .	78,000	28,000	354,708	455,708	Cheviot . .	96,000	...	27
Clackmannan .	11,000	15,440	29,440		"	12,000		
Dumblarton .	27,000	14,000	163,800	204,800	Blackfaced and Cheviot	72,000	47	78
Dumfries . .	137,000	81,000	484,953	702,953	Cheviot . .	507,000	45	50
Edinburgh . .	91,000	34,000	109,925	234,925	"	155,000	47	38
Elgin . . .	91,000	9,000	240,000	340,000	Cheviot and Blackfaced	80,000	47	28
Fife . . .	189,000	38,000	106,427	328,427	Cheviot . .	81,000	47	27
Forfar . . .	210,000	22,000	335,750	568,750	Blackfaced and Cheviot	149,000	47	27
Haddington .	95,000	18,000	71,142	179,142	Cheviot and Blackfaced	109,000	46	33
Inverness . .	80,000	33,000	2,610,501	2,723,501	Blackfaced	694,000	47	32
Kincaidine . .	107,000	8,000	137,250	252,250	"	47,000	47	31
Kinross . . .	25,000	7,000	17,812	49,812	Cheviot . .	32,000	...	32
Kirkcudbright .	98,000	68,000	449,313	110,313	"	370,000	48	27
Lanark . . .	120,000	81,000	361,867	568,867	Blackfaced	222,000	46	29
Linlithgow . .	39,000	15,000	27,113	81,113	Cheviot . .	26,000	...	35
Nairn . . .	21,000	3,000	113,500	137,500	Cheviot and Blackfaced	24,000	...	26
Orkney and Shet- land . . .	44,000	23,000	531,726	598,726	Blackfaced	51,000	46	44
Peebles . . .	30,000	12,000	185,869	227,869	Cheviot . .	185,000	45	29
Perth . . .	248,000	92,000	1,474,063	1,814,063	Blackfaced and Cheviot	679,000	46	35
Renfrew . . .	45,000	39,000	74,268	158,268	Cheviot and Blackfaced	33,000	48	63
Ross & Cromarty	104,000	17,000	1,895,375	2,016,375	Blackfaced and Cheviot	382,000	...	26
Roxburgh . .	130,000	52,000	246,494	428,494	Cheviot . .	483,000	45	24
Selkirk . . .	15,000	6,000	145,524	166,524	"	169,000	45	29
Stirling . . .	68,000	35,000	192,875	295,875	Cheviot and Blackfaced	114,000	46	37
Sutherland . .	18,000	5,000	1,184,188	1,207,188	Cheviot . .	209,000	46	32
Wigtown . . .	104,000	29,000	194,906	327,906	"	139,000	...	27

# IRELAND.

County.	Cultivated Acres.	Reclaimed and Permanent Pasture.	Unreclaimed Lands.	Total Area.	Total Number of Sheep.	Mean Annual	
						Temperature.	Rainfall.
ULSTER PROVINCE.							
Donegal.	231,000	421,000	534,457	1,186,457	171,000	...	54
Londonderry	191,000	206,000	116,389	513,389	43,000	...	39
Antrim	254,000	364,000	91,692	709,692	78,000	48	34
Tyrone	269,000	269,000	240,543	778,543	62,000	...	40
Down	331,000	192,000	88,130	611,130	73,000	47	29
Armagh	177,000	100,000	35,328	312,328	15,000	48	37
Monaghan	150,000	135,000	33,733	318,733	21,000	...	...
Fermanagh	107,000	246,000	64,735	417,735	18,000	48	44
Cavan	158,000	244,000	64,260	466,260	34,000	...	40
LEINSTER PROVINCE.							
Longford	80,000	121,000	56,221	257,221	41,000	...	...
Westmeath	113,000	256,000	54,769	433,769	180,000	...	38
Meath	175,000	36,000	43,362	578,362	250,000	...	...
Louth	107,000	67,000	27,251	201,251	61,000	...	...
Dublin	98,000	98,000	30,303	226,303	81,000	49	29
Kildare	133,000	226,000	59,415	418,415	173,000	49	...
King's County	123,000	231,000	39,019	493,019	172,000	...	30
Queen's County	144,000	221,000	59,854	424,854	123,000	48	...

Wicklow	.	119,000	237,000	143,895	498,895	212,000	...	42
Wexford	.	237,000	282,000	57,040	576,040	155,000	...	34
Carlow	.	84,000	114,000	23,293	231,293	81,000	...	35
Kilkenny	.	179,000	281,000	47,254	507,254	132,000	...	...
MUNSTER PROVINCE.								
Tipperary	.	279,000	595,000	174,969	1,048,969	352,000	...	40
Waterford	.	102,000	233,000	121,305	456,305	72,000	...	40
Cork	.	453,000	995,000	390,921	1,838,921	437,000	51	37
Kerry	.	145,000	538,000	426,356	1,159,356	127,000	...	59
Limerick	.	180,000	410,000	72,972	662,972	96,000	...	40
Clare	.	145,000	401,000	162,264	763,264	194,000	...	43
CONNACHT PROVINCE.								
Galway	.	224,000	801,000	474,209	1,499,209	708,000	...	46
Roscommon	.	130,000	337,000	118,407	535,407	210,000	...	36
Mayo	.	137,000	533,000	601,281	1,321,281	365,000	...	...
Sligo	.	92,000	231,000	123,085	451,085	81,000	43	41
Leitrim	.	84,000	207,000	35,212	376,212	21,000	...	...

# ABSTRACT.

	Cultivated Acreage.		Reclaimed and Permanent Pasture.	Unreclaimed Lands.	Total Area.	Total Number of Sheep.
	Crops.	Grass.				
England	18,086,000	2,400,000	10,607,000	6,497,397	32,590,397	20,325,000
Wales	743,000	315,000	1,394,000	2,282,436	4,734,436	2,439,000
Scotland	2,070,000	1,235,000	1,006,000	15,323,377	19,639,377	6,932,000
Ireland	3,323,000	1,658,000	10,062,000	4,776,924	20,319,924	4,836,000
	19,722,000	5,603,000	23,069,000	28,835,184	77,234,184	34,532,000

Comparisons of one county with another, or even percentages of grass lands to the number of sheep, are generally more interesting than valuable; and indeed, for the reason that cattle are not represented in these tables, any calculations of such a nature would be misleading. While partly alien from our subject, it is worthy of note, that Scotland possesses the largest percentage of grass under rotation; and if it is a fact that the larger the area under grass, the less exhaustive is the system of rotation, we have Scotland taking the lead. This, while I do not give it as a correct conclusion, indicates the general system of cropping, and it may pretty nearly represent the truth as to honour of precedence in good farming, though under an inferior system of cropping the farming itself may be good, so far as that system will allow.

Almost one-half of England is under cultivation, one-third is reclaimed pasture, and one-fifth consists of unreclaimed lands. Only one-fourth of Wales is cultivated—one-third being reclaimed grass, and one-half unreclaimed lands. Scotland has only one-sixth part under cultivation, about five per cent being reclaimed pasture, and no less than eighty per cent is unreclaimed. There is therefore only one-third of the British Isles under

arable culture, more than one-third unreclaimed, and the remaining third is pasture lands.

With reference to the extent classed as reclaimed pasture in Ireland, much of it may be safely said to be *unreclaimed*.

## CHAPTER III.

## THE LEADING SHEEP OF BRITAIN.

It is quite possible to make a volume solely on the subject of the points of the sheep of Britain and their crosses, so much have pure breeds become now intermixed, not only with each other, but with each other's crosses. A careful consideration has, however, led me to select four kinds as the leading and typical breeds of these islands—the Leicesters, Downs, Cheviots, and Blackfaced or Highland; and these, we find, will also amply represent the various *habitats* of the country.

## 1. THE LEICESTER.

This is the type of the long-woolled and Lowland breeds, which, in the Lowlands, have now no rival for weight and early returns. It is very docile, not hardy, nor so prolific as some other breeds. The fleece weighs about seven pounds, and the carcass eighty pounds on an average. The mutton is second rate, and when over two years is

less profitable by accumulation of fat. The most important varieties are Lincolns, Teeswaters, and partly the Cotswolds—all coarser, yet, in some points, almost equal to their type. A valuable cross of the Leicester with the Cheviot ewe is well adapted to some parts of Scotland, of which those on the Ochils are good examples. The main value of this sheep lies in its crossing abilities with almost all other kinds; and in this respect alone it has made changes and improvements that are really wonderful. There is not a county in the British Isles, and perhaps not a civilised country in the world, where the Leicester, or traces of his blood, cannot be found. It enjoys rich moist pastures, where there is quantity in small space. It does not, perhaps, actually consume more food than the Down, for example; but, owing to its quiet ruminating habits, little supports it, and much goes to fat.

## 2. THE DOWN.

This is usually classed, by the old distinctions, with the short-woolled, though it is now more properly a middle-woolled breed, in consequence of improvements. The flesh is finely grained and well flavoured; indeed, epicures consider it second to none; and certainly it is to England what the



Blackfaced is to Scotland. The wool is short, close, curled, and fine, and free from spiry projecting fibres. The Down now comes to as early maturity as the Leicester, and is well known for endurance of hard stocking and patience under occasional short keep. Though polled, there is little doubt of their origin having been horned, and probably also black woolled, as the present black hue of the head and legs, and the occasional appearance of entirely black lambs and small horns in males sufficiently indicate their wild ancestry. They may be taken as the type of the Midland grounds of Britain. The average weight of the wether varies from sixty-five to ninety pounds, and the fleece four pounds. The principal varieties are the Hampshire and Shropshire Downs—the latter being now recognised as a distinct breed. Both are stronger but coarser than the high-bred type as above described. A cross with the Cotswold ewe is in high repute in England.

### 3. THE CHEVIOT.

These are now the representatives of the lower mountains, yet in parts disputed by the Blackfaced. The fleece, averaging three pounds, is of medium length, close set, and fine, and the carcass averages sixty pounds. The flesh is fine grained, and about

equal to the Blackfaced. The wool is inferior to that of the Down, and not so fine since the introduction of the Leicester blood. Generally, the Cheviot is a hardy and well-balanced sheep, with good walking powers.

#### 4. THE BLACKFACED OR HIGHLAND.

We are now on the top of the mountains, among a race of sheep, the present type of which has arisen from judicious selection, and not crossing. The wool is open, long, coarse, and shaggy. The carcass is invariably short, round, and firm, but narrow on the back; average weight sixty pounds, and fleece about three pounds. There has been no really good cross between this and any other sheep.

#### GENERAL REMARKS.

The Leicester takes the first place as a rent-producer. Its remarkable precocity—no doubt a kind of prematurity arising from its being so much artificial—its fattening at one year, and reaching full growth when two years old, give it a position to which none of its neighbours can approach. It has no more bone than is necessary for its support, and though the mutton is not so much esteemed as others, its weight gives value for other purposes.

The Downs are remarkable for health, which arises partly from their mode of management, and partly from the nature of their habitat. Wherever the lowland soil is not rich enough for the Leicester, the Downs find both summer and winter pasture.

It does not require a long acquaintance with the Leicester to note the thorough submission of itself to man's will; all sheep are so in some measure, but the Dishley Pet is pre-eminently so. Give it a little to eat often, under easy circumstances, and you may make a daily footstool of it, without any training to companionship. It has been made for the country, and not the country for it. The other three have, however, picked out their own particular walks, from which they will not change unless they are *changed* by much intermixture of blood. It is quite possible to bring even the mountain breed to prefer the Leicester lands, by a simple though attentive crossing and recrossing, stage by stage, down through the Cheviot (and it may be the Downs), into a "Leicester one-fifth Blackfaced," or rather, perhaps, a "Blackfaced four parts Leicester." The mountain sheep is not lost in this. Leave it and its fellows to their own freedom for a few years, and the original type will soon reappear.

There is hardly one point of resemblance be-

twixt the Leicester and Blackfaced; the one is purely of man's modelling, while the other has had no handling except in careful selection among themselves; the one must have its food, and a lot of it, taken to it, the other will search for it anywhere, and live for days on a handful. There is as much difference betwixt these sheep as there is between hothouse and hardy plants—they are the extremes of this country. The Down is perhaps the medium in these respects; the tinge of their origin, which still adheres to them, gives a hardness that would otherwise be remarkable for the choice of habitat, and yet they are quiet feeders and good stayers at home. The Cheviot is certainly the most convenient sheep, as, apart from special economy, he will thrive anywhere, on much or on little, in mountain storm or by dreamy mansion. To be everybody's dog is a bad recommendation for a dog, but quite otherwise with the sheep; and it is unquestionably the fact that the Cheviot has the best *general* mutton and wool.

The names of sheep, according to age, are not dated from birth but from *clipping*. By this method the first "*shear*" includes about fifteen months, so that, in speaking of a two-year-old, it is really three months more. The following will be found generally applicable:—

*Male.**Female.*

- |   |  |
|---|--|
| 1. Tup lamb, till weaned.   | 1. Ewe lamb.   |
| 2. Tup hog, or wether hog if castrated, from weaning till first shearing.   | 2. Ewe hog.  |
| 3. Tup, shearling tup, or shearling wether, from 1st to 2d clip.            | 3. Gimmer.   |
| 4. Two-shear ram, and two-year-old wether, from 2d till 3d clip, and so on. | 4. Ewe, if in lamb, barren gimmer if not ; and if not put to the tup is a yeld gimmer. |

A tup or ewe three times shorn is a three-shear tup or ewe, and a wether continues a wether ; after that they are aged. A ewe failing to bear a second lamb is a barren ewe ; and after ceasing to give milk, a ewe is called a yeld ewe. When taken from the breeding-flock she is a *draft-ewe*, and the gimmers *draft-gimmers* ; and *draft* is applied to others as occasion requires. The names in England, and indeed in localities of both Scotland and it, are a little different, but those above given should be understood anywhere.

## CHAPTER IV.

## THE WOOL AND MUTTON OF BRITAIN.

THE variety and quality of its sheep are now, more than ever, one of the most striking features of British agriculture. There are few people who ever think of the real magnitude of this subject ; who recognise these Isles as standing at all prominent as regards the production of wool and mutton. Not only in quality and variety, but proportionately to any other country in the world, Britain feeds the largest number of sheep. Irrespective of adaptability of physical characteristics, the mere fact that of all animals this is the easiest fed, gives perhaps the largest returns in the shortest time, and is a first-class fertiliser of the soil, is sufficient reason for such a prominence. Another cause, though a secondary one it may be to the purse, is John Bull's respect for his own table.

The last ten years even have added immensely to the importance of this production, as wool has risen above 100 per cent, and mutton 50 per cent

in value. And first as to wool: The 34,532,000 sheep of Britain may be thus classed:—

Leicesters, and their allies	.	12,933,000
Downs	" "	6,130,000
Cheviots	" "	4,368,000
Blackfaced	" "	5,101,000
Welsh	.	2,000,000
Irish	.	4,000,000
		<hr/> 6,000,000
		<hr/> <hr/> 34,532,000

Leaving out of account exportation, importation, ages, and any other influences on the number of sheep annually clipped in Britain, we shall take, for the sake of plainness, and as the most likely to be correct, the exact number and proportions thus classified in our calculation of the quantity of wool:—

Leicesters	.	12,933,000 fleeces at 7 lbs. each	90,531,000
Downs	.	6,130,000 " at 4 lbs. each	24,520,000
Cheviots	.	4,368,000 " at 3 lbs. each	13,104,000
Blackfaced	.	5,101,000 " at 2½ lbs. each	14,027,750
Welsh and Irish	.	6,000,000 " averaging 2 lbs. each	12,000,000
		Total number of lbs.	<hr/> 154,182,750

It would serve little purpose to attempt determining with absolute accuracy the value of these 154,000,000 lbs. of wool, as the price varies almost every season; but taking an average of 10d. per lb.

we have the handsome annual return of £6,425,000 from this source alone. The average price of South Down wool for the last fifteen years has been 1s. 4d. per lb. The average weight of the British fleece may then, from this table, be set down at four pounds.

Wool is very much a cultivated article, not only as respects the conditions under which the sheep is brought up, but also as to its being regularly *cropped*. Clipping preserves its quality, as when the fleece is left to nature for a length of time, its fine quality disappears and a good deal of hair comes up. The degree to which this takes place is, however, much influenced by climate. In every fleece there are several qualities of wool. In the Blackfaced not more than three; four in the Cheviot; five in the Leicester; and not less than seven or eight in the Downs. Of course, each kind of fleece has to be "sorted" to these extents respectively before manufacture. As a general rule, the best wools are easily determined by their closeness and spiral or curly form, and the worst by their openness and straight hairy appearance. A leading guide for good quality is when the wool feels rich and soft on being handled.

The great divisions of wool are the Short and Long—the one division embracing that under four inches, the other of course those beyond that—in



some cases reaching to eight inches. A more detailed account of the wools than is requisite here would have to embrace a sketch of their different properties, such as fineness, softness, soundness, and colour ; and while good descriptions of these are to be got in other works, any amount of reading without the long daily experience of the grazier is of little service to the young husbandman.

Of the four typical sheep of this work, the Blackfaced and Leicester are long woolled, and the Down and Cheviot short. It seems rather unaccountable that the two extremes in the sheep of Britain, as shown by the Leicester on the one hand, and the Blackfaced on the other, should yet be rivals in one respect at least ; namely, their wool—both being long, and the finer samples of the mountains making up to the pet Leicester in some instances. The explanation is, that the *old* Leicester was a coarse, extremely long-woolled animal ; that it has been entirely changed and remodelled, to the great improvement of both body and fleece ; that, however, the fleece has become secondary to carcass, and as high feeding cannot co-exist with the best quality of fleece, the Leicester wool has *gone back* a good deal to its original. On the other hand, the original Highland or Blackfaced sheep possessed a very fine wool, and

though not fed so artificially as the Leicester, it has become much changed, improved in body, while the same process has deteriorated its fleece. Thus, from rather opposite conditions at the beginning, but from somewhat similar causes afterwards, the wools of the most hardy and most delicate sheep of Britain have come in one respect to resemble each other. I do not for one moment compare the two together *as a whole*; but this subject of *length* of wool, with one or two other points, is, I think, deserving of physiological inquiry.

It is well known that although much increased in weight per fleece, the wool of Britain has not generally improved in quality. History shows that even five hundred years ago this country depended very much on its woollen manufactures. The various applications of this produce are well known to every school-boy.

If we are correct in assuming that a little under three years is the average age of the various sheep, it follows that about one-third, or 11,510,000 of the whole number, must be killed annually; and taking an average carcass at 65 lbs., we have 748,150,000 lbs. as Britain's slaughter of her own mutton. This, at about eightpence per lb., makes £25,000,000 of annual value. It is no unimportant produce of a country that realises above £30,000,000 a-year.

## CHAPTER V.

THE DIVISIONS OF THE BRITISH ISLES BY  
REPRESENTATIVE SHEEP, WITH MAP.

THE map accompanying this work exhibits the distribution of the four prevailing classes of sheep taken as types of British breeds—namely, the Leicester, Down, Cheviot, and Blackfaced. As explained in Chapter vi., exception has been made with the Irish and Welsh in consequence of their importance in numbers, though not so in other respects comparatively, and in the map they are represented by a different colour also. They are altogether confined to Ireland and Wales. Properly speaking, all Ireland should be shown as under its own sheep, for there is not one county in it where any other kind predominates. It was, however, thought desirable to show to what extent well-directed introductions of Leicesters and Downs are taking place there, in spite of many disadvantages. It has been found difficult to trace this so satisfactorily as could be wished, and what is re-

presented is not guaranteed so much as those for England and Scotland.

As a whole, it will be observed that England is essentially a grower of Leicesters and Downs, and Scotland of Cheviots and Blackfaced. An isolated spot, having the Peak of Derby as a centre, claims a predominancy of Cheviot; and this Peak is also the south limit of the Blackfaced, which follow the pennine backbone from the Borders, with a branch eastwarding to the sea in the North Riding of Yorkshire. There is evidently a growing encroachment of the Leicester in the eastward branch of the Blackfaced; and by the advance of improvements there is no doubt that, ere long, the south Leicester ground will join itself to that of the north in Durham, by which time the moors in the east of the North Riding will stand as an isolated Blackfaced spot in the map. Part of Derby and Stafford show a detached area of Down supremacy, as do also the wolds of Lincoln, and part of Salop and Hereford shires. Devon and Cornwall are about equally divided between Leicesters and Downs, but the latter do prevail; had they been otherwise, the Leicesters of England might have been entitled an *Inland* sheep, keeping clear of the sea-breezes as much as possible. The main Down lands require no explanation; they are the most

distinctly defined division in the British Isles, as these sheep are also, with the Blackfaced, the most exclusive livers. In other words, they have a peculiar habitat, on which others do not thrive.

The great body of Cheviots begins at the Wear in Durham, crosses their home ground at the Borders, and continuing northward, occupies the whole of the south of Scotland, reaching to Perth and Forfar, with a branch up the fertile valley of the Tay, but having exceptions, however, in Lanarkshire and part of Berwick, which are distinctly Blackfaced breeding quarters. The more cold and barren parts of Forfar and Kincardineshire intervene to break up the connection of south and north Cheviots, as from Aberdeen they keep sway all round the more fertile coast-lands into Sutherland and Caithness, where they reign almost exclusively. There are also parts of the west coasts of Ross and Inverness where Cheviots are gaining ground, though yet too limited for representation on a small general map.

The Grampians, with their south and north connections, are still altogether under the so-called native breed, the Blackfaced—with, of course, many good flocks of Cheviots in the more cultivated straths and glens.

With this rough description of the divisions of

the British Isles by representative sheep, let us now endeavour to indicate approximately the area under each class:—

England:—			Acres.
Leicesters . . .	.	.	15,000,000
Downs . . .	.	.	12,000,000
Cheviots . . .	.	.	1,400,000
Blackfaced . . .	.	.	4,100,000
			<hr/>
Scotland:—			32,500,000
Cheviots	9,300,000		
Blackfaced	9,000,000		
			<hr/>
			18,300,000
Ireland—Native Breed			20,000,000
Wales,       "       "			2,400,000
			<hr/>
			73,200,000
			<hr/>

The areas of Scotland are exclusive of deer-forests. In any useful comparison it is necessary to keep out Ireland and Wales. We now ascertain that nearly one-half of England is under Leicesters; less than one-third under Downs; one-eighth under Blackfaced, and the balance of one-twenty-fifth is Cheviot ground. Scotland is about equally divided between Cheviot and Blackfaced. Including Ireland, and granting that the Blackfaced are from the original stock of the country, there is no less than 63 per cent of the British Isles still claimed by the native breeds.

## CHAPTER VI.

THE PECULIARITIES OF DISTRICT AND CLASS  
MANAGEMENT.

HAVING shown the prevailing kinds of sheep in each county, and by the map their relative distribution, we have now to describe the practice or peculiarities of management, and other points, as they occur in each division. A more particular sketch will be given of those counties which are representative of the homes of the four typical sheep; namely, Leicestershire for Leicesters, Sussex for Downs, Roxburgh and Sutherland for Cheviot, and Perth for Blackfaced.

## 1. LEICESTERS IN ENGLAND.

Beginning with Cornwall, we find that great attention is here paid to *wool*, not only for its own sake, but as a better protection in the more severe exposures. It is seldom washed on the sheep's back, and is generally sold in the yolk. Of course, a good fleece necessitates good spring keep. Eating

turnips on those pastures which are to be broken up in spring is universal, and in severe weathers, hay and oats are given with them.

Next is Devonshire, where lambing begins in early February—the ewes being on the meadows; and where lambs are sold fat when a year old. Leicesters in Somerset are secondary to Downs, but in Gloucester they or their allies are the principal stock. Lambs come about the beginning of March, and are taken to the yards, with access to a grass field, where turnip is given during the day. When sufficiently strong, the lambs, with their mothers, are removed to the turnip field. Good hay is also given the ewes, for the sake of the milk, at this time. When turnips are exhausted, they are put on grass till July, when weaning occurs. At Michaelmas, lambs are turniped, some getting hay, and also corn and cake; and they are mostly all disposed of before they are two years old.

The Cotswold hills rise to above 1000 feet; the soil is thin and lies immediately on the lime; the climate has been much improved by plantations. There is a breeding flock on almost every farm. The lambs, or “teggs,” are sold when twelve months old. Some fatten their sheep in covered pens, and even tie them up like cattle. The Vale of Berks has a mild and salubrious climate, but the pastures



are badly managed, and the meadows are not what they ought to be. Oxfordshire, with its diversified soils and rather cold climate, produces some good grass. Turnips and vetches are eaten on the land by sheep, the latter from May to August; and when on vetches, and perhaps rye, the sheep require water. The meadows are grazed during the day. The general sheep management is good, and many lambs are fattened and sold at fifteen months without cake or corn, and this by attention to regularity and change of food. From January to April they have cut turnips, then mangold, rye, trifolium, and vetches; and in June vetches and trifolium; July and August provide clover and vetches; and September and part of October finish up with clover, rape, and turnips. Christmas generally brings the first lambs, when the ewes are confined to yards with turnips and hay, and some get corn and peas; but beans are the principal artificial food. A second lot of lambs usually come in February, and these receive no corn, but turnip, hay, and grass till July, when they are disposed of. After this the ewes fatten and are killed up to October. Store lambs are arranged to come from January to March.

Buckingham's Vale of Aylesbury is famous for a peculiar richness of pasture, but probably more

suited to cattle than sheep. Ewes seldom get anything but grass, and lambs come in January and February; these get beans and peas (crushed), and are sold off from May to August. Wethers are kept on the higher grounds; they are bought in spring, and by summer fattening are disposed of up to October, and a few kept for Christmas. The Leicesters of Bedfordshire are good, and here ewes are put to the ram at Michaelmas. The old ewes are fattened and sold—a good deal of cole-seed being used. The teggs have usually cake and corn during winter, with beans and some oilcake. In Northamptonshire sheep-grazings are rather neglected. Breeding flocks are numerous where a good deal of outside grass adjoins the arable. Lambs are sold at Michaelmas, ewes are on grass in winter, but at lambing they get oats, hay, and roots, in the yards. Shearing takes place from May to June. Huntingdon and Rutlandshire management possesses nothing particular. In the former the ewes before lambing are put in yards at night, with corn and cut chaff, and lambs are kept on the grass lands during winter. In the fens of Cambridge the rape is fed off with sheep, without hurdles. Worcester and Warwick sheep are almost altogether Leicesters. In the latter—perhaps the most central county of England—they are a very

prominent stock, and most farms have a ewe flock. Lambs are ready for the fat market from twelve to fifteen months old.

The county home of our subject—Leicestershire—now comes in course of review. Geologically, the sandstone and lias occupy the greater area, the former the west, and the latter the east side. Its 514,000 acres consist of 177,000 cultivated, 274,000 of reclaimed or permanent pasture, and 63,000 acres are unreclaimed. Fully one-half is therefore under permanent grass. The corn lands are chiefly on the sandstone, and the grass on the lias. The absence of naturally wet lands, and mountains not over 900 feet, help to keep the climate mild. The mean temperature is about 48°, and the rainfall as low as 27 inches. If anywhere, Leicester sheep management ought to be the model here, and generally we do find it good. Yearling wethers are usually bought in September and October, and from the following May to July are in good condition. Some farmers winter winter-stock—partly of lambs—a little corn and cake being given on the grass. In the breeding parts lambs are early fat. The 466,000 sheep of this county—or nearly one to the acre overhead—indicate natural richness more, perhaps, than superior management, taken in connection with the fact that

its general agricultural practice does not stand very high.

The Downs dispute Stafford and Shropshire with the Leicesters. These counties, with Chester, are not particular sheep districts. In Chester it is common to buy ewes in September, keep them on stubble till ploughed, then put them into the cow-pastures for lambing, and afterwards on clover or old grass, preserved for the purpose. Winter wethers are not numerous here, and others of them are purchased in June and July, and parted with in late autumn. On the drier soils the Norfolk system of hurdling on turnip is adopted. It is worth noting that the pastures of this county—a cheese district—are kept up with *bone-dust*. Lancashire has a variable climate, with its mosses and moorland extending to 1800 feet above sea-level. Leicester sheep therefore keep to the southern parts; but, taken as a whole, they are not very select or important. There is also in Derbyshire a good deal of moor and mountain, with a variable climate, but the class of sheep is more select. They are put on turnips from October to May, when clovers are ready. Turnips are sliced with dry food, and should the clovers be late, cabbages are sometimes used. There are a few Leicesters in the uplands, but they are sent to

the lower grounds after the first winter. Of the area of 659,000 acres, only 151,000 are cultivated. The best pastures are on the limestone. Many of the lambs are ready for the butcher at twelve months.

Keeping still northwards, we have Nottingham, where nearly every farmer is a breeder—less or more. They dispose of the wether hogs fat before July. To do this the clovers are grazed, previous to which the sheep have turnip, linseed cake, and corn. The moors of Lincoln—the highest ground being 600 feet above the sea—are an improving agricultural district, with a pretty equable climate and great variety of soils. The sheep are fed on turnips in the usual way, and get oilcake and tares.

We now come to the extensive county of York, the smallest division of which—the East Riding—is about equal in area to the average of the other counties in England. This Riding is the only undisputed one of the three as regards prevailing head of sheep, as it is almost entirely left to the Leicesters and their allies. It is naturally divided into wold or upland, and vale—the one being chalky and rather bare, rising to 800 feet—the other lying on the sandstone, with heavy soils, and not exceeding 100 feet above sea-level. In regard

to sheep management, the tupping (by stocking) is completed in the middle of October, when the ewes get rape, as being most conducive to prolificness. Where rape is not procurable, the tupping is loose, on turnips, this lasting for about six weeks; they are then put on grass till February. Turnips are again given, in conjunction with dry food, as an inducement to increase of milk. Ewes and lambs are put on the clover pastures till weaning in end of July. Those lambs, or rather hogs now, requiring to be forced, are then put to rape, cut turnips, oilcake, and barley. This is considered very high feeding, and a more thriving system is preferred by "canny"-going farmers, by keeping to turnips alone. Rock-salt is given, but not to ewes near lambing. The wether hogs are got off fat when about thirteen months old. The West and North Ridings are held by the Leicesters on the low grounds, and by the Blackfaced, or their class, on the moors. In the west the management of grass lands is well attended to. The sheep eat the turnips on the ground, where they have boxes of cut straw-chaff and salt. On the poorer lands cake is given with turnips. The lower grounds of the North Riding are more famous for cattle breeding than sheep grazing; a large proportion is therefore under permanent

grass. Here also turnips are eaten on the land. Sheep are seldom kept over two years.

We have now reached the north end of the continuous great centre belt of Leicester ground in Britain. It has one line from the south of Cornwall to the moors of Yorkshire. But these moors are the break to what would be an unbroken stretch throughout Durham northwards to Alnwick in Northumberland, with the exception of narrow stripes immediately south of the Tyne and Tees. The Leicester area of these two counties is rather circumscribed, and, from the general character of the border lands, gives place to Cheviots and Blackfaced.

## 2. DOWNS IN ENGLAND.

Taking the counties from south to north, where those sheep predominate, we start from Devonshire, where the heath-clad hills are not favourable to Downs, as some well directed attempts have failed to accommodate their constitution to both soil and vegetation. On the east point, however, nearest the chalk, good flocks are increasing, in consequence both of proximity of chalk-lands and greater geniality of pasture. Dorsetshire is prominent in sheep husbandry. The soils are chalk, sand, and clay. A peculiarity here is the ewe "leazes" of

the hill-farms: they are the best parts of the Down pastures, and although grazed by the general flock at times, they serve principally for the inferior but improving ewes, or rather ewe-hogs, and are commonly distinguished by the term "hog-leazes." On the chalk hills it is considered that every acre should keep a breeding ewe. Dorsetshire wool is above an average. The peculiar practice of folding prevails here. The ewes are fed in summer on the hill-grass during the day, and at night are folded on the arable without food. Of course by this system of manuring the farmer keeps as many sheep as possible, and often more than is desirable. Again, the loose chalky soil requires much pressing, or rolling, so, early in the mornings the shepherd has to drive backwards and forwards his flock over the arable field, doing about ten acres in three hours with 800 head.

The south-east of Somerset and south of Wilts possess valuable sheep of this class, as indeed do the whole of these counties, in degree. In the latter the undulating and elevated district of Salisbury Plain is prominent. Here the thin dry soil of the chalk is well adapted for "folding," which, with artificial manures, is also one of the props of Down husbandry. Though this soil is generally thin on the chalk hills, there are excellent water-



meadows in parts, which guide the summer shifts. Folding is practised throughout the year, and the chief stocks are store and breeding ewes, as in Dorset, few being fattened. It is only where there is no convenience for breeding that wethers are kept, and these of course are parted with in autumn for stock. The draft ewes, after shearing, are separated from the stock, and put on better keep, and sold in autumn, either to produce another lamb, or fattened off, the former being the more general.

Mutton and wool form at least one-fourth of the dependence for rent in Hampshire. Stocking here is very close, and has to be made up by as close feeding, and this the Down sheep are capable of doing. Straw is put on the ground after the eating up of its grass or roots, and by folding at night an increased valuable manure is thus obtained, and, at the same time, a good dry bed for the sheep. Cake and corn are used extensively by some; but the greater number not being able to afford these, the green crops in the rough state are much in use. In the south-east of Berkshire there is important sheep-farming, though the grass lands are not generally good. There are both breeding and "dry" flocks. The chalk downs of Berks rise to 900 feet. Here breeding flocks are important;

the ewes and lambs are separated about the end of May, and folding is practised. Lambs get a variety of food, such as rape, vetches, and sainfoin. Following into Sussex—the nursery of the Down sheep—we find that the area of 937,000 acres carries 580,000 sheep; one-third of the surface is still unreclaimed, and about one-fourth is in permanent and reclaimed pasture. The usual proportioning of the flocks here is one, two, and three-year-olds. One-third of the ewes are drafted about Michaelmas, and sold with the lambs, but, of course, retaining a sufficiency of lambs to keep up the flock: the eighteen-month teggs take the place of these drafted ewes. Lambing begins about the end of March, and three weeks afterwards they are folded, generally on arable. In this county the value of such manure is set down at *one-fourth* of the value of the sheep. For autumn feeding rape is much cultivated, and is given from the middle of September till Christmas. In winter some turnip and mangold are used.

Kent possesses distinct physical as well as agricultural characteristics; the climate is generally mild and salubrious; the soils varying with the chalk, greensand, and weald. A good deal of excellent pasture is found on the London clay. The name, "The Garden of England," is claimed

by Mid-Kent. For breeding and fattening large numbers of sheep, Romney Marsh is justly celebrated, and is rather peculiar for these purposes. Except during very severe weather, the marsh sheep get nothing but grass. This advantage is, however, counterbalanced by the lambs having to be sent long distances up the country in winter—say from September to April—at a cost of five to six shillings each; and during such an important stage of their growth, having to be out of the eye of the master, they return with little more than bone and skin, so that the change to better food takes away many of them by death. Kent ranks next to Sussex in regard to Downs.

Surrey—"The sunny side of London"—has various soils, and a rather dry climate, and though otherwise showing a badly-managed agriculture, its heath mutton is much appreciated. In Buckingham, part of the Chiltern Hills is bleak and cold, and grazing prevails in place of breeding. It is an almost general rule to clear off the ewes every year and have a fresh supply. This practice is followed with the Downs, more perhaps because in association with the Leicesters there, the latter tending much to rot on the very rich pastures. Wethers are purchased with the ewes and fattened.

Lamb-fattening for the London market prevails

in Hertfordshire. The ewes are bought in July or August, put to clean-up stubbles, and afterwards removed to turnips. Lambing begins in December, and is generally over by middle of January. Before lambing, hay-chaff is given to the ewes, and as soon as lambs can eat they get cut swedes, oil-cake, beans, and cut clover-chaff without stint, and are handed to the butcher as early as possible after the turnips are finished. This should take place not later than the middle of May. Owing to proximity to London, this county is, however, more a grazing than a breeding one.

In Essex the sheep are yard-fed in winter. In autumn wether lambs are purchased, put to the straw-yards, and in summer are folded on fallows, or fattened on clover. There are rich meadow-lands here. Cambridgeshire fattens large numbers of sheep with corn and cake, but is more an arable than a grazing district, though some very good runs exist on the uplands.

The heavy lands of Suffolk are not well suited for folding; and though some farmers feed their sheep in pastures during winter by carting turnips to them, they are yarded at night. An opposite course is adopted on the light soils, where folding on turnip at night, and depasturing by day on the heaths and grasses till lambing time, is pretty

general. Ewes and lambs are then put on rye. Turnip sheep are sold fat from March to June. Norfolk is more a highly cultivated arable than an upland grazing county. In the Fens the sheep are fattened from twenty to twenty-four months old. Hoggets are bought at spring markets, put to old grass or "seeds," and in autumn are finished up for the Christmas butcher by folding on rape and cake. Turnips are much used with older sheep.

We have now to leave the great belt of South Down country, and by the map we find a district of Down sheep in Hereford and part of Salop, where their management much resembles what has already been sketched. Keeping northwards, another break occurs, and a tract of Down country comes in on the north of Stafford and Derby shires, and here the flocks are particularly selected from the best in the southern counties.

The Wolds of Lincoln may now be marked as a Down-growing district. Grasses and old pastures serve as the principal food, and the sheep are classed and arranged according to kinds and nature of pastures, so that large flocks are seldom seen. The turnips are consumed on the land.

This sketch of the peculiarities of district Down sheep management does not require to embrace some parts of Ireland, which, though coloured as

under the same class, do not in reality possess more than "introductions," as explained in a former chapter.

### 3. CHEVIOTS IN ENGLAND.

While confessedly the best-farmed county in England, Northumberland also claims the parentage of the Cheviots; and, properly speaking, only other two counties south of the Borders—Durham and Cumberland—show any prevailing hold on the hardy whitefaces. There is, however, a sort of isolated spot, connecting the counties of Derby, Chester, Lancaster, and York, and having the Peak of Derby as a centre, to which these sheep have got introduction, and seem to do well.

The 1,250,000 acres of Northumberland are just one-half improved, and this half is about equally divided betwixt cultivated lands and permanent pasture. Overhead there is, despite the great extent of unreclaimed, one sheep to every  $1\frac{1}{2}$  acre. The mean temperature is probably the lowest in England, as low as any in Scotland even, with the exception of Aberdeenshire. The climate is subject to sudden changes, and the 2700 feet of altitude give bleak moors and induce every variety of physical characteristics. The soils of the Cheviot Hills are generally light, but they are heavy and

rich near the coast. The pastures are invariably excellent for sheep, and those of the low lands fatten when the hills cannot, climate and soil combining to favour the grasses. On the South and North Tyne tributaries, the farms are mostly breeding ones, and indeed altogether there is more breeding than feeding. Ewe-flocks are therefore plenty; they have the pastures in autumn and winter, and, unless in severe weather, get no turnips till within a month of lambing, and up to the arrival of grass. The greater surface of turnips is eaten by sheep, as little more is given to fatten them here. Wethers are brought up for the knife in their third year, and ewes disposed of at four years, when the purchaser invariably takes another lamb before killing. In spaining, the lambs are put on heather for a month, with the view to making them hardy.

#### 4. CHEVIOTS IN SCOTLAND.

(1.) *South*.—While England can boast of the birthplace of this now valuable breed, there is no doubt that Scotland has taken the lead in their production, not only in numbers but also in superior quality. A greater area of adaptable climate, altitude, grass, and turnip growing, and perhaps an infusion of Scotch energy (with all respect to

Northumberland's high agricultural merits), have given to Scotland unquestionable superiority here. A notice of two counties for the south, and one for the north, will show any peculiarities. For the former we choose Roxburgh and Haddington—the one eminent in pastoral husbandry, the other in high farming.

More than one-half the area of Roxburgh is unreclaimed, and yet, on an average, it carries more than one sheep to the acre. The climate is under the mean of Scotland, both in temperature and rainfall; the soils very various, with a great diversity of surface configuration—from the Cheviot Hills, 2700 feet above sea-level, to the rich plains of the Tweed. The old ewes and lambs, not required to keep up the breeding stock, are sold before autumn. The ewe-hogs thus retained are either put away on a separate part of the hill grounds, or, after a fortnight's separation of spaining process, are again returned to the flock, and invariably each finds her own mother. The latter plan is now much preferred, as the hoggets have the advantage of their mothers' acquaintance of the grounds, and are found to thrive much better. Autumn brings the necessity of salving and bratting the sheep. Topping begins about the third week of November. Breeding rams and ewes of the



home stock are taken to produce select specimens for future upkeep. By the 1st January the tupping is over. Though apparently an exposed district, the flocks do not require much more in winter than the usual "foggage" of the pastures. To meet emergencies, however, stells with stacks of hay are provided, which are used only in the most severe weather. Turnips are, if possible, reserved for spring use, and are then given to the ewes and lambs in preference; clipping is as late as July, and previous washing is pretty general.

Haddingtonshire has an average temperature and more rainfall than the Roxburghshire valley of the Tweed. More than one-half of the area of 179,000 acres is in cultivation, but there is only one sheep to every one and a half acre overhead. The soil is mostly of a clayey nature. Sheep are generally folded on turnips, and to finish up fattening get dry food. The ewes, lambs, and hoggets, after being fattened on turnip and grass, are disposed of in summer and autumn. The stock on the uplands is mostly ewes, which begin lambing when two years old, and after producing for three seasons, they are sold to the lowland farmers, who generally take another lamb and fatten both.

(2.) *North*.—The representative of Cheviot management in the north of Scotland is unquestionably

Sutherlandshire. The 1,207,000 acres of this county are classed into 18,000 cultivated, 5000 permanent pasture, and no less than 1,184,000 unreclaimed; though about 130,000 of the latter are deer-forests. The 209,000 sheep have thus nearly six acres each. The mean rainfall and temperature are exactly those of the mean of Scotland—32 inches and 46°. Several of the mountains rise to above 3000 feet, with a drainage from sea to sea, east and west. The prevailing rock-formation is gneiss (or granitic, according to our classification), and from the situation of the land, the soils are local. The general character of the Sutherlandshire pastures is good; the variety of exposure and elevation gives variety of grasses, and the higher grounds also provide that change of heathy food so beneficial to sheep. The remarkable disproportion of pasture and unreclaimed lands to the cultivated arises partly from over-extensive sheep-runs being in the possession of a few men, and partly from a sort of over-bountiful nature, in respect that the Cheviots grow like mushrooms, and everybody tries to make the most of such a peculiar habitat. Perhaps one of the best sheep-producing parts of this county is Strathfleet, running east and west between Golspie and Loch Shin. The railway now goes through it. The

highest point of the centre of the valley road is about 400 feet above sea-level, and the surrounding hills do not exceed 1500 feet. The north side of the Strath is granite, the south gneiss; there are no woods, and only a few spots of indigenous birch; the soils are loamy. There is a good deal of whin in the lower end of the ground. Over the whole of this district there is a regular intermixture of grass and heather, the grass reaching even to the tops of the hills, and the heather coming far down. Scattered irregularly over the Strath are old cultivated spots, some as high as 1000 feet above the sea—the marks of the crofts of some fifty years back. An experienced and extensive flockmaster in Sutherland told me that he considered the existence of these green old arable spots as one of the main causes of the superiority of the Strathfleet sheep; not only have they great variety of nature's providing, but also a sweeter bite, as they choose, in richer places. Heather is, however, gaining ground even low down; the climate has no doubt fought long against this, but the natural tendency of the soil will ultimately prevail, and unless improvements are effected by careful burning and liming, this mutton glen will ere long lose its celebrity.

Sutherlandshire ewes are kept for five years, and wethers for three. They are mostly bought up for

feeding-off in the English borders, where the north Cheviots are preferred to those nearer themselves. For want of a proper proportion of adjoining arable, a large number of the sheep have to be wintered in Caithness and the southern counties. Lambing begins the last week of April, but there are more wethers than ewes kept on the higher grounds, as being more hardy. Wether lambs are therefore bought from the south, or the lower farms of the same district. Some fine tups are bred here, but it is thought judicious to introduce new good blood from the south at times.

#### 5. BLACKFACED IN ENGLAND.

This alpine breed of the British Isles is looked upon by the general public as being peculiar to the Highlands of Scotland, probably rather for the reason that the heather mutton of the latter takes the market in preference, than that it is specially a native of the one country more than the other.

There is still a large extent of the north of England under these sheep and their associates—such as the Herdwicks. In Yorkshire they are found in the north and west, and are even fed on the lower turnip lands. The Lancashire moors are also held by the Blackfaces, which are bought in spring, kept till November, and wintered in the neighbour-

ing lowlands. The altogether Scotch character of Westmoreland and Cumberland, with mountains 3200 feet in elevation—though geologically different—and a very large rainfall, marks them for the hardy Blackfaces. The lime and sandstones, however, give more and better vegetation, and variety of loamy soils. Turnips to a large extent are consumed on the ground, both for breeding and feeding. There is a growing disposition in Westmoreland and Cumberland to lay the greater extent of arable land under permanent pasture. With an increase of cattle and sheep, turnip cultivation will no doubt become more important, and at present these counties are not behind in this respect—the humid climate and friable soils materially assisting in the successful management of this root. It is only on the few properties as yet, however, that sheep-husbandry receives the attention it so much deserves in this district; forethought in providing shelter and winter food is also needed, and that careful selection which alone can bring the Blackfaced breed to cope with those of Scotland.

#### 6. BLACKFACED IN SCOTLAND.

Some writers affirm that the Cheviots are gradually displacing the Blackfaced breed throughout

most of the uplands of Scotland, that they are as hardy, and must ere long take possession of the higher grounds also. I think this very unlikely. A glance at the map at once shows that the Blackfaced still hold all the Grampians, the principal islands, and a number of the hills, as special breeding districts, in the south counties. There is very little chance of any decrease in the demand for real Highland mutton; and the fact that the Cheviots could not live where the Blackfaced do make a living, will always draw the limitation line for the former, unless some extraordinary physical change takes place in their constitution, or in climate.

(1.) *South.*—Lanarkshire is the nursery of the Blackfaces. The greatest number of breeding stocks is taken from this county, and also large numbers of wether lambs for the north of Scotland. The Lowther hills rise to above 2000 feet, with a humid and rather cold climate. Ewes begin to have lambs when two years old, and are cast off at five or six years, and if not kept to be fed off in the district, are sold mostly to south dealers for the purpose of taking a cross lamb, and afterwards feeding. The Lammermoor hills are also famous for good flocks of this breed.

(2.) *North.*—The counties of Aberdeen and Perth

are the representatives of the Blackfaced in the north. Perth, "the Yorkshire of Scotland," has a temperature the mean of the kingdom, and a rainfall fully above the average. Out of the 1,814,000 acres of its area, 1,474,000 are principally moor and mountain. Both counties are of the primitive rocks, but Perth possesses more variety of soils, and agriculturally is more noted than the other. As Blackfaced grazings, there is probably nothing in Britain to compete with some of the runs here—those in the neighbourhood of Loch Rannoch, for example, being celebrated for turning out a large carcass. There is more grass at a higher elevation in Perth than in Aberdeenshire; ewe stocks are therefore more numerous, and wintering not so difficult. Good management characterises the sheep-husbandry of this district. Smearing is pretty general.

While remarkable for its beef, Aberdeenshire hardly takes a second place for its mutton and wool. Next to Inverness it has the highest mountains in Britain. The temperature of the average of the county is the lowest, and the rainfall a little above the mean of Scotland. Turnip growing is prominent, so as to meet the great demand for the wintering of the hill flocks. Wether stocks are preferred; the greater number are

brought from Lanarkshire as lambs, and sold as fat, or for further fattening in the Lowlands, when three years old. Washing of the wool is generally adopted. Graziers having spare cash take Lowland farms, both for the convenience of wintering their flocks, and for economy in doing so. An over abundance of rank heather is a great drawback to successful management. Forfar, Kincardine, and Morayshire, may be called the winter quarters for the Aberdeen, Banff, and Inverness Highlands.

#### 7. WALES.

To describe all the native breeds of sheep in Britain and its islands, would be a departure from the object of this work ; but, owing to their greater number and prominence, exception will be made as regards the Welsh and Irish breeds—and a brief notice of them will suffice.

These highlands of England are not well managed in regard to sheep ; yet many of the hills are green to the top, and the larger runs have within themselves both summer and winter pasture. Some of the Welsh sheep are horned, and others not ; they are a wild and wandering breed ; the wool—which is short—varies in colour, being white, grey, and sometimes black. The head is small, with a long neck, and every way the body is



light. Altogether, the Welsh sheep are much inferior to the Blackfaced, both in size, mutton, and fleece.

Leicester and Southdown introductions and crossings are now gaining ground in the cultivated parts, but on the great range of uplands and mountains the native breeds largely prevail. Greater attention to turnip husbandry is also gradually improving the stocks. Welsh sheep-management is characterised by early weaning, for the sake of getting milk for cheese. This is bad for both mothers and lambs; weakening the system of the one, and stinting the growth of the other. The custom also prevails of clipping twice in the year, with a view to procuring finer wool, and the *lamb*s are also clipped once the first summer, though this is being much discontinued; and though in many parts, before a better general agriculture was begun, it was the case, it is not so much the practice now to buy sheep in spring and sell them all in autumn. Some of the wool is fine, but generally it is very coarse and kempy. Even apart from crossing with other breeds, were the Welsh sheep to receive a fair amount of practical and scientific attention in selection from among themselves, as is done with the Blackfaced, a marked change would soon take place both in form and wool. The wethers are at their best when four

years old, the usual weight being not over forty pounds, and the fleece about one and a half pound. The mutton is of excellent quality.

### 8. IRISH.

Little can be said in favour of the native breeds of this country, and unfortunately, nearly as little of any extensive introductions of others. The physical characteristics of the island are remarkably well adapted to the breeding and rearing of all kinds of sheep. There is no intense heat or severe colds; a mean of  $48^{\circ}$  of temperature, and no less than 40 inches of annual rainfall, together with variety of hill, dale, and grasses, mark it specially for sheep-husbandry.

There is a short and long woolled native breed, the latter being the more numerous. The former, the Cottagh, has a small head, upright ears, long neck, small bones, and light body. The long-woolled are long-legged, long-necked, and long in the head, with large ears and grey faces, and a narrow but large body. The wool of both is naturally good, and this, along with other points, has been improved by Down and Leicester crossing.

Several successful introductions of Leicesters and Downs have been made, as shown in the map;

but Irish prejudice restricts any well-directed efforts to a few enterprising men. To attempt to point out what is needed to improve the sheep-husbandry of Ireland, would lead into the whole "land" question of the present moment; but were even a fair amount of attention paid to ordinary management and turnip growing, very marked effects would follow. Throughout the whole year the natives in many districts are allowed very much to have their own way, and wander on the mountains indiscriminately.

To conclude, it is evident that peculiarities of sheep management—what breeds, and how they are dealt with—are regulated chiefly by the character of the districts in respect to soil and climate. Looking at England and Scotland as a whole, it is noticeable that the Downs and Leicesters are confined to the former—Scotland being divided between Cheviot and Blackfaced. Of course it is not the fact that neither Leicesters nor Downs exist in Scotland. There are, especially of the former, many flocks equal to anything south of the Borders; but they do not *predominate* in any district, and therefore cannot be represented in accordance with the principle of our arrangement.

There is another important difference between

the two countries: it is the exception in England, but the rule in the greater extent of Scotland, that sheep have to be changed from summer to winter pastures. A most interesting work could be written on those lands which produce varieties of wool and mutton, for there exists such a marked difference within even one grazing and with one class, that these peculiarities could be as nicely mapped as the county divisions.

## CHAPTER VII.

## THE GRASSES PREFERRED BY SHEEP.

Nothing can be more important, and more deserving the attention of the flockmaster, than the natural *food* of his subjects; and yet nothing connected with sheep has received so little attention, either at his hands or those of scientific men. There appears to be a literal belief in the proverb, that "sheep have golden feet, and *wherever* the print of them appears, the soil is turned into gold"—or grass—for this subject.

When an investigation is made as to which of the many grasses, natives of this country, are really of any agricultural value, and the number is again revised for those of them good for sheep, and preferred by them, it is surprising how the list diminishes, and comes down to about two dozen. That this is the case is abundantly shown from the experiments made by the Duke of Bedford, or rather his gardener, Mr. Sinclair; and as is shown in several more modern works,

specially on grasses, as well as from miscellaneous papers.

I give a table of those grasses, natural to the British Isles, and which are found to be most favourable for sheep. They are arranged in the order of priority in flowering. The figure after the month denotes the week of that month.

# THE GRASSES OF BRITAIN MOST FAVOURABLE FOR SHEEP.

No.	Botanical Name.	English Name.	Flowers in	Prevailing Locality.	Nature of soil preferred.	Prevailing Altitude.	Remarks.
1	<i>Anthoxanthum odoratum</i>	Sweet-scented vernal	April 1	General	Deep and moist	Under 3500 feet	Said to give a flavour to mutton. Much liked.
2	<i>Alopecurus pratensis</i>	Meadow fox-tail	" 4 Average May 4, but all summer.	"	Rich	Under 1500	
3	<i>Poa annua</i>	Annual meadow	"	"	Various	All over	
4	" <i>pratensis</i>	Smooth-stalked meadow	June 1	"	"	Under 3000	Common in Devonshire and Lincolnshire, where fattening of stock is celebrated.
5	<i>Trisetum pratense</i>	Narrow-leaved oat	"	"	Chalky and various	Under 2500	
6	<i>Melica uniflora</i>	Wood melic.	" 2	"	Clayey	300, limit 1500	
7	<i>Dactylis glomerata</i>	Rough cock's foot	"	"	Damp and shady	Under 1000	
8	<i>Bromus arvensis</i>	Taper field-brome	"	"	Rich	Under 500	The greatest favourite.
9	<i>Festuca ovina</i>	Sheep's fescue	"	"	Dry sandy	Up to 4000	

10	<i>Festuca durinacula</i> .	Hard fescue .	June 2	General	Various	Under 3000	A favourite.
11	<i>Lolium perenne</i> .	Rye-grass .	"	"	"	Under 1000	
12	<i>Arrhenatherum avenaceum</i>	Oat-like soft	"	"	Clayey	Under 1500	
13	<i>Poa trivialis</i> .	Rough-stalked meadow	"	"	Rich, moist, and sheltered	...	Very good.
14	" <i>nanoralis</i> .	Woodmeadow	"	England	Rich	Under 1500	
15	<i>Hordeum pratense</i> .	Meadow barley	"	Norfolk	Chalky and various	Under 500	
16	<i>Alopecurus alpinus</i> .	Alpine fox-tail	July 1	Grampians	Marshy	Not under 2500	
17	<i>Cynosurus cristatus</i> .	Crested dog's tail	"	General	Micaceous	Under 2000	
18	<i>Bucetum pratense</i> .	Meadow fescue	"	"	Various	Under 500	Very good.
19	<i>Triticum caninum</i> .	Bearded wheat	"	"	Various, but moist and shady	Under 500	A favourite.
20	<i>Trisetum flavescens</i> .	Yellow oat .	"	"	Various—chalky	Under 1000	"
21	<i>Agrostis setacea</i> .	Bristle-leaved bent	"	S.W. England	Sandy heath	...	Devonshire.
22	<i>Bucetum loliaeum</i> .	Long-gluined bucetum	"	General	Meadows		
23	" <i>elongatum</i>	Elongated bucetum	"	"	"		



Several things are to be gathered from this table; and the important ones are—earliness, altitude, and nutritive value. Though flowering is no indication of the time when a fresh bite may be had, it is a guide as to what date previously the leaves of the particular plant may be had for sheep, as also to the probable duration of it for autumn use. These points are most important to the grazier. It will be observed that two of the grasses flower in April, twelve in June, and eight in July. The annual meadow-grass, while common to all the summer months, may be set down with the average of the fourth week of May. Taking the second and third week of June as the average date of the flowering of those grasses best liked by sheep, we are struck with the apparent lateness of it; but have to reflect, as already hinted, that much herbage, both of the favourable, and other grasses less liked by sheep, is available long previous to that time,—the peculiarities of situation determining earliness. The liberal kind provision of nature is apparent in distributing these grasses over no less than four months of the year, with, in the case of our subject, the greatest favourite in the middle period, in all parts of the country and at all altitudes. There are comparatively few grasses

peculiar to localities, and at the same time of any agricultural value. There is, as a general law, not so much relation of earliness and soil to altitude as is generally imagined. Local specialties, without reference to soil or height above sea-level, will often make a difference of not less than a fortnight in the early keep of a district. The diversity of the same species is observable, however. We have, for example, the meadow fox-tail flowering in the end of April on a rich soil, and confined to 1500 feet altitude; while the alpine fox-tail does not flower till July in a marshy soil, and does not come under 2500 feet. The smooth-stalked meadow-grass, again, flowers about the 1st of June, and extends to 3000 feet; but the wood meadow-grass chooses a better soil, and confines itself to half that altitude; and the narrow-leaved oat-grass, and its brother yellow oat-grass, while both liking chalk, keep under 2500 and 1000 feet respectively, with a month's difference in flowering. This property of family variety gives to all natural pastures—which invariably possess a number of species—a great superiority over artificial grounds, where, generally, a few kinds only are sown. With the exception of *Lolium perenne*, or rye-grass, all those in the foregoing table are *permanent* growers, and suitable for pastures and hay.

The clovers are too well known to require any notice. The red, white, and yellow, and their varieties, prevail in Britain, on light, rich, limy, dry soils, and altitudes under 1500 feet. It is also unnecessary to give a scientific description of any of the grasses, as, to the general reader, and practical grazier in particular, such a way of making up a book is especially disagreeable.

It is worth knowing that under close grazing the rough cock's foot is apt to die out, but its place is soon filled up by the finer sorts. Some of the grasses, such as rough-stalked meadow and yellow oat, are very sociable, and unless in company with others are liable to pine away. The smooth-stalked meadow-grass is very hard on the soil, which it impoverishes with its long creeping roots. Everybody knows the annual meadow-grass, from its growing literally *everywhere*, from mud-holes at the seaside to alpine crevices, and it is often looked upon as an annoying weed. For earliness, reproduction, and permanency, the meadow fox-tail deserves attention. The crested dog's tail is remarkable for withstanding a long drought. The sweet-scented vernal, or spring grass, while the earliest of all, is also one of the most permanent, and, from its strong scent, gives the well-known "hay-smell," and is said also to flavour mutton with the same constituent.

It is not too much to affirm that even one class of sheep prefer grasses that another would pass over, and this because a certain constitution or state of body having to be kept up, nature allows the animal to select the kind of food best adapted for it. For example, the Downs live well on the bent, sheep's fescue, hard fescue, and crested dog's tail; while upon these, without an intermixture of cock's foot, meadow-fescue, fox-tail, and the clovers, the Leicesters would make a poor show.

Let me impress, in concluding, the primary importance of this food subject; that the nature of the grasses and their nutritive qualities, even at different times of the year, is the making of the sheep; that different breeds of sheep have their particular favourites; different lands produce different grasses, or different grasses prefer certain soils and localities, both for meadows, uplands, and hills. "Roughness" and a "good sole" are no signs of quality either for sheep or cattle; and the farmer or grazier who is content with either, irrespective of more important adaptabilities, is no honour to nor deserves well of his country, though he should make "*twenty* blades of grass grow where only one grew before."

## CHAPTER VIII.

INFLUENCE OF PHYSICAL CHARACTERISTICS  
ON SHEEP.

MOST people have an indefinite general knowledge on this question; they have often heard it spoken of in an incidental way, and they know—some probably from experience—that a Down will not thrive on the Grampians; but the particular reason, or reasons, have never engaged their attention.

Irrespective of artificial food and man's modification of the laws of nature, this subject of adaptability of certain grounds and their associations, to a particular development of carcass and wool, is, of course, the great starting-point in sheep-culture, and is still by far too much overlooked. Any facts, even within the present century, have been gathered more by accident than actual experiment; the sheep themselves have, as a rule, planned out the kingdom, to the loss of the many that the well-directed experiments of the few might have saved.

The physical character of a country, the nature of the soil, drainage, temperature, rainfall, and vegetation, have marked influences on the various kinds of sheep—not only on those introduced from different habitats, but even on those whose constitutions have been long inured to the particular ranges where any change of climate may be brought about. It does not require a profound naturalist to pronounce the present British Downs, Leicesters, and Cheviots, as almost altogether artificial—that their original stock was not altogether wool-bearing animals, but half-wild, half-hairy, and ill-shaped (economically speaking). The body and fleece of Britain are decidedly the result of culture, climate, and pasturage; the former shapes the frame, and the others direct the clothing of it. Irrespective of temperature, the nature of the soil and grasses influences the character of the fleece. Temperature, again, affects the quantity of wool, as also its fineness and general quality, and the proportion of hair in it. In very cold countries, for example, the outside of the fleece is composed of coarse hair, and next the skin is a layer of wool, which thickens and grows longer in winter. The opposite state of climate, or great heat, also produces more hair than wool, where breed and good management are wanting; so that we find *extremes*

alike of heat and cold most unfavourable for sheep. The medium, then—the temperate country—should be the wool and mutton one—say (for Europe) France, Spain, and south of England and Ireland.

No doubt all animals are subject to variety as determined mainly by breed and climate; but no kind of animal varies so much as the *Ovis* in adapting itself to circumstances, or becoming acclimatised. This provision of nature may at first sight seem to take much responsibility off the hands of man in any attempts at improvement; but an opposite view points the sheep as the peculiar friend of the human race—going where they go, changing its very form and produce for them where physical changes do occur, and yet remaining unchanged under an equable and temperate climate, and at all times highly susceptible of good or bad management. The fact that sheep arrive at perfection only in temperate countries, and that they will, like many other animals, of their own instinct avoid extremes when in a state of nature, is evidence enough of their domestic value. All sheep being originally horned, we are not to be surprised at the tendency in our so-called polled breeds to return to nature in this respect under careless management, or when they are subjected to much change of temperature. The horn, then, is a good

indication of the quality of a sheep in other respects. And besides, let the breeder always remember that nature cannot be entirely subdued in specialties other than the horn. In some of our best improved low-country flocks, such as the Downs, there are often distinct marks of their origin in the *dark* line on muzzle and legs, and at times a puzzling bold reversion by the appearance of an entirely black lamb.

The effect of soil on wool is very observable. The hard dry soils, such as the chalk and sands, turn out the worst kinds, and the rich lands give the best, but, of course, both variable according to classes. From these causes the wools of Sussex and Surrey are better than those of Essex and Norfolk; the Leicestershire and Nottingham better than those of Oxford and Bedford; while in Scotland those of Roxburgh are superior to the Lothian wools.

Vegetation, the difference of kind and quantity of grasses, will, on similar situations, give a difference of form, size of bone, and other points in the same animal. We have accordingly, from this peculiarity, some very distinct makes of the Blackfaced sheep on a range of hills belonging to one property—it may even be to one grazier; and this distinction will characterise the ground for a very long time. And



it requires little reflection to reach the conclusion that the difference of disposition in the Leicester and Blackfaced is not so much a difference of race as of habits—the one in a low-lying country, and the other in a hilly one—from tameness to comparative wildness.

But again, the nature of pasture has, very naturally, a strong influence on the flesh of the sheep. While some practice is required to distinguish betwixt turnip-fed mutton and that from rich grasses, there is no mistaking the striking difference—the superior difference in the opinion of the gastronomer—of that fed on the mountains of Scotland. It is not so much because mutton is *blackfaced* that it is best for the table, for the Cheviot, by long depasturing on the same keep, acquires in a great measure the same heather flavour. The extension of artificial food, and high feeding, have undoubtedly changed the wool and mutton of most of our British breeds, to the general profit of the grazier ; but it is questionable whether superiority of either produce has thus been secured. A forcing system is an unnatural one, and it is not possible to get a large early carcass, and at the same time sweet mutton and fine wool. During the first improvement of our crosses the wool was evidently sacrificed to weight

of carcass ; but now, as a rule, as much attention is paid to the one as the other.

As a whole, however, there is yet a want of decisive evidence on the question as to what food may be safely relied on by *any one*, but especially the inexperienced sheep-farmer.

## CHAPTER IX.

DISTINCTION AND PRESENT GENERAL CONDI-  
TION OF PASTURE LANDS.

FROM the acquaintance already made with the various districts of the British Isles, and the character of their pastures, it will be easy to sketch briefly their present general condition, and see what is needed for their improvement.

As a general rule, the granitic rocks claim the alpine pastures, the limestone and its associates the uplands, and the sandstone the lowlands. If we take these as representatives, and make allowances for geological peculiarities of districts, we have set down pretty correct distinctive bases for the sheep grounds of this country.

Each of these is distinguished by striking physical characteristics besides that of soils; their very outline, for example, at once indicates each, and of course their main features as to temperature, rainfall, and herbage, all being more or less regulated by altitude. We have seen that these pasture-grounds are in many cases far from being what they

ought to attain to, even by ordinary management. It is very well to farm or graze according to the most modern and approved methods, or what is often termed "high farming;" it is good to endeavour to attain to it, but, for our present purpose, nothing more is required than to show that the wants of our pastures are to be met by the ordinary plans of improvement, and not by any unusual or extraordinary ones.

Why are our natural pastures left to themselves, and no periodical system of improvements—modified according to district peculiarities—kept up as in the cultivated lands? Grasses do deteriorate and decay like any other vegetation, and though, in time, nature in some cases recovers herself, it is man's duty to assist this process of renovation. The natural food of sheep has not kept a corresponding advancement with their own many improvements, and it is undoubtedly the fact that failures have occurred in consequence of this—failures from want of sufficient and nutritious herbage; diseases induced by sour wet grounds, and deaths in severe exposures; repetitions of which have been avoided in many cases by the conjunction of science and practice; and to these I will advise the cases which yet remain uncared for, which are probably in the majority.

The improvements more imperatively required by the distinctions just named are, burning, shelter, divisions, and drainage, for the mountainous; drainage, breaking-up for renewal, increase of arable surface, and shelter, for the uplands; and drainage, liming, and irrigation, for the lowland grounds. These are given respectively in the order of their importance.

That our higher hills are far too "*black*"—are covered with an undue proportion of old heather—is the experience of most graziers of the districts. Burning produces grass and short sweet heath, much relished by sheep. On the question of grouse *versus* sheep—which much or little heather really is—is not the following fact sufficient evidence of the incompatibility of wool and feathers? An old experienced grazier, when arranging with me for a relet of his ground, offered the grouse-rent extra, over and above the new valuation of the grazings, on condition that he got the entire management of the ground in regard to heather-burning. He would not sublet nor kill the birds for sale. The hill extends to about 14,000 acres, and carries 2700 sheep; old rent £315, new valuation £410. The shooting rent was £300, so that the grazier was prepared to give £710 for the whole. There is suggestive matter here. It must be understood

that the ground is too high for keeping sheep in winter, and long heather therefore is less an object for an occasional bite for sheep in deep snow. It is an excellent grouse-moor. Heather being important shelter and winter food for grouse, the grazing tenant, by an almost total burning, would have very soon rid himself of them, and made it pay by the great increase of grass and sweet short heather.

What, and how much, heather to burn, is often a matter difficult to settle between the shooting and grazing tenants. The former, as a rule, prefer plenty of six and nine inch heather for nesting, and food and shelter in winter; but the other as little as possible, especially when the grounds are too high for winter keep.

That "shelter for sheep is half meat" is of great importance in the improvements needed in the Highlands, as any other kind, is evidenced by much dear-bought experience, of which we have old and recent records. Without reference to *local* climate, which is directly connected with vegetation, the subject of planting for shelter affects not only the food of sheep and their growth, but on occasions protection for life. Whatever the nature of the climate of a certain range of grazings, the more equable that climate can be kept, and free from

extremes, the more healthy and valuable in every respect will be the sheep that belong to it. We have great stretches of mountain lands, otherwise excellent runs, but which, with the exception of the natural lie of the grounds and isolated spots of indigenous birch, offer no shelter whatever to the thousands of sheep that live upon them. Not only does shelter produce direct effects, but in the course of a few years the pasture improves—comes earlier and in greater quantity, and probably lasts longer. There are many examples in this country of successful planting in high altitudes, even up to 2000 feet above sea-level, where, by judicious selection of situation, soil, plants, and careful management, a very considerable amount of shelter has been produced in fifteen years.

In most large hill-grazings there is great want of division-fencing, whereby flocks could be taken periodically from one section to the other, in place of lodging on special portions of the run. Even fenced marches betwixt the tenants of the same property are not common; and though the expense of division by wire would be considerable, there is little doubt the result—not only in securing clean runs, but quiet for the sheep by non-herding—would be profitable. There is invariably one part of large runs which is more suitable for one class

of the flock than another; and this is especially the case with regard to ewes, gimmers, and hoggs, which should not take their turn with the others in going over the grounds systematically. In such instances, and where the size of, say the ewe division, is very considerable, it is worth while to subdivide this again, for the sake of a *clean* change for the sheep, and a *rest* for the grass.

It is not often the case that drainage is much needed among much heather, but this is more frequently the case where the heather is grassy. It seems almost superfluous to have to show that grazing soils may be too wet, that the drying of them produces more grasses, and improves the quality of them, that it very greatly reduces the disease called "rot," and in other ways is conducive to the health of the flock.

The uplands of Britain, both from their greater value and the nature of their soil and situation, call more for general improvement than the other two. There is no reason why the greater area of the pastures from 500 to 2000 feet above sea-level should not be within one-third as valuable as those parts of them which have been made arable or otherwise reclaimed. This result can be brought about without the application of more than ordinary means—drainage, breaking up for renewal, and



shelter. The necessity for shelter is by no means regulated by altitude ; the difference, for example, between the top of Arthur's Seat at Edinburgh, and excellent arable land at Braemar, Aberdeenshire, is nearly double, yet no one would dream of rearing the crops on the former that are found in the latter; so throughout the British Isles there are great varieties in its uplands alone, many of which are isolated by their geographical positions, or want of genial neighbourhood. It is not the simple walled enclosure, narrow strip of wood, or fanciful clump of trees, that is enough in all situations. While these break the blast, they do not temper or ameliorate it; and until such a result is overtaken, it is physically impossible, in the ordinary course of unaided nature, to improve either climate or vegetation. We want our flocks not to have to run so much *to* shelter or accommodate themselves to localities in late autumn, winter, and early spring, but to be enabled to obtain sufficient food at all times and in most places. Yet, of course, subject to great *exterior* causes. There is perhaps no more important question than this, as affecting not only our subject, but the general wellbeing of the nation.

When we look into the general condition of these uplands, we are obliged to distinguish betwixt

two grand geological formations—the cretaceous and granitic; and we will sufficiently describe the present state and wants of each, by taking the extreme latitudes of Britain,—the Southdown hills of England, and the Sutherlands of Scotland. The chalky downs or uplands of the south of England are at once a distinct and peculiar subject of management. Instead of any drainage being required, the thirsty chalk is always ready for more water; these thin soils yield therefore naturally a scanty herbage, though it is generally fine and sweet. The looseness and poverty of the surface necessitate the characteristic employment of sheep for its improvement—the folding of them to enrich the ground, and the driving of them over it, as so many rollers, to solidify for crops. There are few trees on the middle and higher parts, and but for the climate these hills would be left very much to nature. There is risk in subsoiling much, with the view of ultimately securing a greater depth of workable surface, and the great labour required to convert chalk into anything like a loam by sheep-feet and manure, renders the breaking up of pastures for renewal of grasses a slow process. This should be the aim however; and if it is a fact that most soils contain nutritive grasses, which only appear on the soil being made

suitable for their growth, there is a valuable future for these Downs, when climate is already so propitious. There is more than theory in such a prospect, as, in South Wales, of less genial temperature, though better soils, the white clover (*Trifolium repens*) springs spontaneously in the limy soils, and there it was long the custom to lay down the permanent grass *without seed*, as the land clothed itself when not exhausted by cropping. If there be similar efforts of nature in the south of England, they are evidently of less power, as otherwise the sward of the chalks would now be more prominent.

While on the subject of renewal of grasses, it is worth while to notice one or two points in the deterioration of some pastures. Several causes—such as want of returning what the sheep take away, or poisoning the grasses by artificially-fed animals—have been assigned for such decay; but a careful examination of these and similar causes will invariably show that they have little to do with the result, which is really due to the natural law of renewal or succession, to which the limitation of all kinds of life may be assigned. In indigenous forests a different class of trees succeeds another through lapse of time, and just in proportion to their position in the vegetable world,

will grasses come and go. It would be rather serious were there a simultaneous decay of even one species, and in this we recognise the greater value of those lands which produce the greatest variety of grasses. A section of extensive grazings may therefore be apparently poor and unhealthy when under more moss than grass, while all the time it may be undergoing a process of revivification. The practical husbandman, the valuator, the historian even, should be cautious in passing judgment here. If man's assistance by breaking up the surface, accompanied with, it may be, according to circumstances, liming or burning, does not accelerate the production of new grasses, the ground may be set down as really poor.

Sutherlandshire, as we have already seen, is essentially a sheep-grazing district, alike in the lowlands and uplands. The drainage of the whole is above an average, but shelter and divisions are needed. A peculiarity of the uplands consists in there being a good proportion of what is called "mossy" grounds, which give an early spring and late autumn bite. The great want of this county is a proper proportion of arable land in direct connection with the several grazings, which is required principally for good and cheaper wintering. With-

out experience it is hardly possible to estimate the loss, the inconveniencé, and sort of poverty arising to this otherwise rich county from its want of more cultivated—more turnip surface. Those not in possession of much or sufficient arable land have to winter their flocks in neighbouring districts, while their own lands are physically well adapted for crops. This is perhaps one of the principal objects in view by the Duke of Sutherland in his proposal, when a large number of the leases terminate, four years hence, to reduce the size of his large holdings, many of which extend to 20,000 acres, some to 50,000, and one at least to no less than 70,000 acres. I think I am safe in saying that these patriarchal flockmasters view the proposed subdivisions favourably; for, when properly understood, it is not altogether a sacrifice of individual interest to general good. All parties will benefit. The crofter who cannot keep a pair of horses profitably on his twenty acres will have a chance of healthy extension; the moderate capitalist will find a field of safe investment; the general community will gain in various ways, besides the introduction of fresh blood; the large tenants themselves will be thankful for the change, as their present rather unmanageable areas will be brought to reasonable compass—subordinate to

the improvements which they do wish carried out, and in which they are willing to set an example once the lands are made more governable—more suited in extent to one man's head and purse. That the proprietor's rent-roll will also greatly increase is undoubted. There are probably several examples, on a smaller scale, of increase of rental by diminution of farms and grazings, and the following I had to arrange in 1864 will illustrate the point.

The hill in question is high-lying, healthy and good Blackfaced ground, extended to 4500 acres, was rented at £302, and carried 2900 head of sheep. Advertisement and personal inducement could not secure a tenant willing to invest £4000 in taking over stock, etc., and give an increase of rent. I knew it was worth more, and judging it was beyond the means of most of that class who are content to live in an out-of-the-way glen, with a good but-and-ben house, I resolved on its division. By nature the ground was favourable for this, and 1300 acres were given to the north portion, which possessed the house, and 3200 acres to the south—equal to keeping 900 and 2000 sheep respectively. To provide a dwelling for the south part I got an arable tenant, having a possession of £52 lying contiguous, to give up for

another, where a death had occurred. The new arrangement stood thus :—

Old rent of whole grazings . . .	£302	0	0
Rent of part added to south division .	52	0	0
	<hr/>		
	£354	0	0
North division let for .	£155	0	0
South (including £52 for arable) . . . . .	250	0	0
	<hr/>		
	405	0	0
	<hr/>		
Increase . . . . .	£51	0	0
	<hr/>		

Here, therefore, by making a large grazing into two, an increase of 17 per cent was realised, and the holdings are not yet too dear.

The Lowlands of the British Isles require least notice in regard to any improvements needed, and indeed, altogether, they hardly come under special sheep-husbandry, being more directly devoted to agriculture. That, however, drainage is necessary in many districts, even with the view to improvement of grass for sheep, is recognised by those who keep pace with the times. Nature gives us a lesson in the use of lime for pastures, and where good drainage is carried out, a judicious application of this corrector—not a *manure*—sweetens the grasses and promotes growth. Another old, but

imperfectly understood thing, is irrigation. How many parts of the lowlands and uplands of this country could be brought under this method of fertilisation. Many seem specially formed for it; the mere notch of a spade would, in numerous instances, bring streams of so much gold on their grass fields and meadows. I am speaking of pure water, and not sewage.



## CHAPTER X.

## UNAPPLIED KNOWLEDGE, AND DISEASES.

THIS may be termed unapplied science and facts; and science should be taken here more as an understanding of facts than a knowledge of the laws which govern nature. All animal life is influenced, less or more, as we have seen, by a variety of physical agencies, but those which rule in our case are certainly temperature and food. If we note all the requirements of a sheep from its birth, it will be evident how completely its form, rate of growth, weight and quality of wool, and quantity and quality of flesh, are dependent upon those conditions, as they may be favourably or carelessly arranged by man.

And first is *Exposure*. In our uplands a continuation of cold and wet weather kills its thousands of lambs; with their soft thin bodies the effect is evidently a stopping of the blood or heat-producing parts, whether well or badly supplied with food. Of course those with kindly, well-con-

ditioned mothers will last longest; but even the ewes themselves, and those especially that have been carelessly wintered, often succumb to exposure or want of shelter.

*Dampness* is another form of exposure, and gives rise to "red-water," and "water-braxy" in sheep. This occurs mostly on low wet grounds, with frost, and seems to act on that part of the body which comes in contact with the ground. It causes chill, shuts up the pores of the skin, and the blood, being thus driven back, mixes with the water. This disease is, in some cases, augmented by the sudden change from dry to wet pastures. Even with good food, sheep cannot lay on mutton when their bed is wet and cold.

Then there is *want of food*, a proper quantity and kind of it. With the great difference of vital energy between the Leicester and mountain breeds, we have stages of susceptibility to the disorders caused by this want; lambs getting other than their natural milk are subject to constipation of the bowels, and those whose mothers have been neglected in winter take diarrhoea from insufficient milk; and in the older sheep the same complaint is brought on by improper food, or that which wants in quality. But the recipients of plenty and nutritious food are able to withstand severe

weather. In deep snow and strong frost how often do we see a flock of sheep very comfortable in a turnip-field with cake and corn! The artificial Leicester is, in such circumstances even, at home; it is a pure case of keeping up a high temperature to meet the opposite exterior influences.

Want of *drainage* also engenders the well-known *rot* and *sturdy*. Foot-rot is never known to exist in hard, heathy, or chalky pastures, but is confined to soft grassy lands. It will be assumed, then, that Down sheep are seldom affected by the rot; and such is the case.

Other forms of disease besides these would no doubt manifest themselves in sheep were *time* allowed for development; but their comparatively short lives take with them the seeds of, probably, consumption and other pulmonary diseases of which we find but little indication. But those thus briefly sketched are all consequent on man's mismanagement or carelessness—his unapplied knowledge of science and facts; they are not beyond his prevention, as those in a measure which are contagious and infectious.

## CHAPTER XI.

## THE GRAZIER'S BALANCE-SHEET.

IT would be of great value could we give a mean of receipts and expenditure for each of the classes of prevailing sheep in Britain, taking average conditions into account, and other circumstances ; but meantime we must be satisfied with that for the Blackfaced in the north of Scotland, with which I am best acquainted. No one man's case is likely to meet exactly that of another, and so I will not attempt to please everyone, and am prepared for a variety of criticism.

Balance-sheets should need little explanation, and the following one has but to be noted on three points :—1. The value of stock on hand at each term of settlement, being in account with each other as it were, shows the loss by deaths and those sheep stolen or strayed, and is always necessary to a correct knowledge of a grazier's position. The interest in each case serves to keep the stock-account separate, and yet allows of adding for a

balance. 2. The wintering is purposely kept rather high. 3. The household expenses may seem understated to many; but, besides this instance being a small one for the north of Scotland, there is a farm, or rather croft, in connection, so that the £55 is properly a proportion, though the larger one, of this item. The free profit is under two per cent on the invested capital.

# BALANCE-SHEET OF AULTCERNEY SHEEP-GRAZINGS.

YEAR TO 28TH MAY 1869.

## CHARGE.

1. VALUATION OF STOCK on hand at White-sunday 1868:—	
500 ewes and lambs at 9s.	£750 0 0
170 two-year-old widders at 24s.	304 0 0
400 Hogs, ewe and widdler, at 17s.	840 0 0
100 granners at 18s.	90 0 0
30 tups at 43s.	67 10 0
	<u>£1451 10 0</u>
2. SALES—	
(1.) Wool, 250 stones laid.	
Highland at 12s.	£300 0 0
(2.) Stock—	
50 shot lambs at 6s. 6d.	16 15 0
90 shot ewes at 15s. 6d.	69 15 0
200 top two-year-old widders at 20s.	200 0 0
10 shot two-year-old widders at 18s.	9 0 0
6 old tups at 28s.	8 8 0
	<u>459 18 0</u>
3. MISCELLANEOUS—Sales . . .	212 0 0
Value of meadow-grass used by cows and cattle . . .	13 1 5
	<u>25 1 5</u>
4. Interest on capital invested in stock as above valued, at 4 per cent . . .	58 0 0
	<u>£1933 9 5</u>
TOTAL CHARGE . . .	£1933 9 5

## DISCHARGE.

1. WAGES—two shepherds . . .	£240 0 0
Meal and milk for them, and dogs . . .	16 0 0
	<u>£256 0 0</u>
2. TAXES . . .	7 15 0
3. RENT . . .	150 0 0
4. WINTERING—500 hogs at 5s. . .	125 0 0
5. HOUSEHOLD—Expenses . . .	55 0 0
6. MISCELLANEOUS—	
Clipping expenses . . .	£24 10 0
Smearing . . .	60 0 0
Travelling, markets, &c. . .	9 10 0
Carriage of wool . . .	1 11 4
Sundries . . .	4 2 3
	<u>79 13 7</u>
	<u>£473 8 7</u>
7. STOCK VALUATION, as opposite, less £30 for deaths and missing . . .	£1431 10 0
Add interest at 4 per cent . . .	57 0 0
	<u>1488 10 0</u>
Balance, being free profit . . .	26 10 10
	<u>£1983 9 5</u>
TOTAL DISCHARGE . . .	£1983 9 5

## CHAPTER XII.

DEER *versus* SHEEP.

THIS is a question growing in national importance. Thirty years ago it was not much recognised beyond the limits of the property or county, because its direct effects were apparently more limited to them; and then, land as a commercial subject was not so well understood as it is now—that the advantage of the few must bend to that of the many—individual benefit to public good. Such is the opinion of the present day.

Before taking up the whole matter, and calculating its national effects, let us see how it stands on an average, and this will be done simply by reference to facts, unbiassed by any class opinion. I consider it proper to say that the data of this chapter were made out two years ago, when to my knowledge there existed no controversy on the subject, and my notes were intended for private use only, and are the result of twelve years' personal experience of Highland landed property. They therefore include a fair proportion of the great increase of shooting-rent during the last six years. While the

facts shown may not be the mean of all the north of Scotland, or even of one county, they are so of an extensive class of properties, and the figures are an average of this class.

First, it is necessary to get at some general statistics, and those as to area, rental, population, stock, and afterwards shootings.

AREA.			RENTAL.		
		Acres.	Farms.	Grazings.	Shootings.
Arable . . . .		3,615	£4,699		
Permanent pasture . .		2,623	2,395		
Heath . . . .		178,611	...	£4,462	£6,573
Woods . . . .		9,841			
Water . . . .		717			
Sundries . . . .		196	75		
Total . . . .		195,603			£18,204

POPULATION.			STOCK.	
Families.	Males.	Females.	Cattle . . . .	327
442	1036	1068	Sheep . . . .	35,790
Total . . . .				36,117

SHOOTINGS.				
Grouse.	Deer.	Rents.		Annual average killed during twelve years.
Extent.		1863.	1869.	
A, 43,629	...	£600	£975	1005 birds and 9 stags.
B, 34,500	...	675	1,350	1569 „ and 19 „
C, 31,396	...	900	1,275	1596 birds.
D, ...	39,279	1,125	1,575	49 stags, 45 hinds, and 990 birds.
E, ...	6,300	900	1,398	77 stags, 72 hinds, and 450 birds.
Acres . . . .	155,104	£4,200	£6,573	



Though no value is placed opposite woods, which is here unnecessary, the area of them is given, as of course the greater extent is included in deer-grounds. To represent a correct rental of the property, an average of £5250 for woods, and £340 for salmon-fishings has to be added, thus making the gross rental £23,794.

Let us now make a column of memoranda on these figures:—

- Rent of arable = 26s. per acre.
- „ of permanent pasture = 18s. per acre.
- „ of whole property overhead = 2s. 6d. per acre.
- Sheep-rent 8d. per acre, and 2s. 5d. each.
- Cattle-rent, 45s. each.
- Shooting-rent overhead = 11d. per acre.
- Rent of grouse = 10s. 6d. per bird.
- Rent of deer = £15 per stag.
- Average weight of stags = 13 stones.
- „ „ of hinds = 7 stones.

There was one bird killed to every twenty acres, and one stag and hind to every 300 acres. Though rather out of place here, let us see the real cost of a stag; and this I am glad to be able to give from the actual accounts of several tenants which have come through my hands during the period named:—

Rent . . . . .	£15	0	0
Proportion of keepers' wages	£3	10	0
" of taxes . . . . .	1	2	0
" of tenant's travel- ling expenses	1	6	0
" of household "	5	3	0
" of winter keep, etc.	1	15	0
		<hr/>	12 16 0
			<hr/>
			<u>£27 16 0</u>

There are more notes here than are really needed for the principal object of this chapter, but they become of use in the event of any challenging of results, and for comparison with other cases.

We have now to show how the proprietor stands financially with the deer and sheep, and it is to be understood that the ground taken up by the former is, for all practical purposes, on an equality with the other—that is, of equal value acre for acre—as much so as the latter is suitable to be converted into deer-forest; and this being the case, our task becomes an easy one.

#### RENT-VALUE BROUGHT BY SHEEP.

1,806 acres permanent pasture, exclusive of cattle	£1660	0	0
142,419 " of heath ground	4462	0	0
		<hr/>	
Total rent got from 35,790 sheep	£6122	0	0

This gives 10d. per acre of rent. For the present side of the argument it is not the number of animals kept on the ground, but the rent that can be got from it, that concerns us. To enable a comparison to be made with the foregoing, it is necessary to arrive at the average of like percentages for deer-forests; and accordingly we find the 45,579 acres of strictly forest ground fetch an average rent of £2500, or 1s. 1d. per acre, and £15 per stag, under deduction of £756 of accompanying grouse-value—that is for the 1440 birds killed. There is a point here which must not be overlooked. While it is fair to allow value for the grouse killed in a deer-forest, because the tenant and proprietor calculate on them in offering and accepting, it is not necessary to deduct a corresponding value in estimating the rent per *acre*, for the simple reason that the deer in reality take up the whole ground, to the exclusion of sheep. It is the same with sheep and grouse moors, to which deer seldom resort; yet in both cases the grouse would be better away.

We have thus given us a distinct rent of 10d. for sheep and 1s. 1d. per acre for deer grounds, or a difference of 30 per cent in favour of the latter. I believe this result to be correct for the greater area of the north of Scotland. Individually, then, it is

better for Highland landed proprietors to put their mountains and glens under deer than under sheep; in the case of the extent taken as our example of an average, it would make a difference of £1800 in the proprietor's rent-roll.

I have found it difficult to obtain very reliable information regarding the extent of land under deer-forests in Scotland, as naturally there exists a jealousy upon this point on the part of the proprietors, and the tenants and factors are unwilling to commit themselves on the subject. There are few things so apt to be exaggerated as the size of hill grounds, whether for sheep or shootings. Except in the rough, by the square mile, few have been actually measured during the last fifty years, unless now those in Forfar, Perth, and parts of Aberdeen and Argyle, by the Ordnance Survey. In advertising grazings and forests to let, therefore, we always find the valuable words "about" and "more or less," in connection with acreages. That they are never *less* may be safely assumed, and often much more may be generally taken for granted. I have known this exist to as much as 30 per cent, not from any wish to misrepresent, but simply from carelessness and want of information.

From my personal acquaintance with several of the counties, added to the nearest data procurable

in others, I now submit a list of those counties in Scotland where deer-forests exist, with their relative extents :—

Caithness	.	.	25,000	acres.
Sutherland	.	.	130,000	"
Ross	.	.	190,000	"
Inverness	.	.	260,000	"
Argyle	.	.	220,000	"
Banff	.	.	30,000	"
Aberdeen	.	.	175,000	"
Perth	.	.	255,000	"
Forfar	.	.	35,000	"
				<hr/>
				1,320,000 acres.
				<hr/>

We have, then, 1,320,000 acres of deer-forest at  
 1s. 1d., giving an annual rent of £71,500 0 0  
 And the same ground for sheep,  
 at 10d., would represent a  
 rent of . . . . . 55,000 0 0

---

£16,500 0 0

---

Here are £16,500 of annual revenue in favour of the proprietors, accruing from letting parts of their estates as deer-preserves. But now for the other, the national side of the question.

According to our previously established averages, these forests produce 8800 stags and hinds. On the other hand, we find that 9,500,000 acres of these counties carry 3,366,000 head of sheep; and

taking, as explained in Chapter iv., three years as the average age of all sheep, there result 156,000 Cheviots and Blackfaced that could be grown and killed annually, on the same area as that occupied by the deer-forests. Let us tabulate this:—

## SHEEP.

156,000, 60 lbs. each, at 8d.	£312,000
300,000 fleeces wool (deducting lambs) at 2s.	30,000
156,000 skins at 5s.	39,000
	<hr/>
	£381,000

## DEER.

8800 stags and hinds, 140 lbs.	
each, at 6d.	£30,800
„ skins at 3s. 6d.	1,540
„ heads, averaging 12s.	5,280
	<hr/>
	37,620
	<hr/>
	£343,380
	<hr/>

Deer *versus* sheep in this country, then, shows a gain of £16,500 annually in favour of the proprietors, and a yearly loss of £343,380 to the nation. These are the plain figures of the case, without any debiting or crediting. A lengthy argument as to extra money left in the districts by shooting tenants, reduction of parish and county rates per £ by the larger rental, or increase to

national tax-revenue from the same source, on the one side ; and nutritive value of flesh, improvement of lands, and increase of population, etc., on the other, would not likely help to mend the question. Were argument desirable, where facts alone are presented, it could be shown how much flesh could be taken from deer-forests, not by sportsmen for sport alone, but by judicious stocking and thinning, as with sheep.

The issue of these statistics brings out one of those modern bugbears, the continual putting forward of which is so enjoyable to many. I stand upon these primary facts of rental and produce per acre, as the most convincing and correct.

## CHAPTER XIII.

## DEDUCTIONS FROM FOREGOING FACTS.

## 1. DIAGRAM OF BRITAIN, SHOWING CHARACTERISTICS CONNECTED WITH SHEEP IN BRITAIN.

PROBABLY the best method to explain this section of the country (see frontispiece) will be to follow the course of a river—or rather go up a river—which embraces all the required characteristics and classes of sheep. On a careful examination of the map, it will be very difficult to find one which presents these as exactly as could be wished; and, indeed, the only one that does so in the order of correct succession from lowland to upland and mountain, with Leicesters, Downs, Cheviots, and Blackfaced in respective order, is the Trent, and its tributary the Derwent—from the sea at Hull to the Peak of Derby, 1800 feet in height. We have there also the sandstone and limestone, but the primitive rocks are unrepresented. There are then but two conditions wanting—namely, sufficient



height and geological formation—to follow out exactly a description of our section.

On the lowlands of the country, and through the greater part of the lower course of the Trent, the sheep-husbandry is chiefly Leicesters up to about 600 feet above sea-level—their famous birthplace being within ten miles of the junction of the Trent and Derwent. The elevation here is also the limit of wheat-cultivation; and generally it may be safely set down as a good guide that Leicester and wheat habitat go hand in hand. Our section shows a small part of the limestone on uplands within the range of the Leicesters. The uplands—part limestone, and principally chalk—are held by the Down sheep up to 2000 feet, according to the section, but in Derbyshire, not over 1500 feet above sea-level. Another step up takes us to the Cheviots—which are here mostly on the carboniferous limestone—limiting about 3000 feet; and lastly, with a universal range, come the Blackfaced. Even these, however, may be said to have a limit in this country, as, above 3800 feet elevation, there is neither grass nor heath, and the few lichens offer little inducement to the hardy Highlanders.

A section of this nature does not require much explanation, and there remains only to note, first, the line of average winter grazing; by this is

meant that sheep of any kind cannot in this country be kept during winter on those pastures which average more than 1200 feet above sea-level. They may be kept on artificial food, but no reliance is to be put on a turn to the dry grasses. Second, the limit of cultivation of grasses is set down at 1500 feet, which is also of course the limit of arable lands. Again, we have the limit at 1800 feet of reclaimed pastures, or those grounds which were partly once arable and partly improved for grazing purposes. The limit of all grasses in the British Isles may be given at 4000 feet, though of course even 3500 will limit those of any value for sheep.

There can perhaps be no better natural division of the British Isles than that made by sheep.

## 2. THE DISTRIBUTION OF SHEEP, BY PREVAILING CHARACTERISTICS OF THE COUNTRY.

All improvements invariably radiate from a centre, but they do not flow equally in all directions—the soil, altitude, rainfall, and temperature, in the case of agriculture, together with man's prejudices, tending individually and in combination to turn aside or altogether dam up the regular flow. The distribution of sheep has also been regulated by these influences; and in Eng-

land and Scotland chiefly by temperature and soil, the former including altitude and geographical position.

Let us take a glance at these as found in association with our four breeds; and our remarks must be understood as general—exceptions being acknowledged. The Leicester distribution is the one with least limit of elevation but largest geographical range. The alluvial plains and sandstones—including the calcareous sandstones, oolite and lias—claim the whole of the Leicesters of England. The mean temperature of this district is 47·4 degrees, the rainfall 26 inches, and the altitude limited by 700 feet. The Down sheep are distributed with more exactness to geological or soil character, as, wherever the lime, in the shape of chalk, appears, there, under some minor conditions, will they be found predominating. This habitat takes them up to 2000 feet above sea-level, with a mean rainfall of 25·5 inches, and a temperature of 49·5 degrees. So much do these sheep keep to the lime, that it may be safely said, were there more arable surface on the Down hills, or a much greater depth of other soil not of a chalky nature, the breed of sheep would have to be changed—probably to the Leicester. The Down country may be described as one great enclosure—

the chalky hills in the centre being the court-yard, and the cultivated lower lands the feeding-pends.

Again, we find the distribution of Cheviots regulated by still less fertile circumstances, which may be termed the uncertain or changeable altitude. This has its limit at 3000 feet, and is made up partly of the limestone and partly granitic rocks. Its centre, or average of 1500 feet, is the limit of grasses under cultivation, above and below which, at means of about 300 feet, is the limit of reclaimed pastures and line of average winter grazing. The Cheviot grounds are characterised by good grass-producing soils, with a rainfall of 36 inches and 46° of mean temperature.

The fourth and last stage takes us to the heather-prevailing region, the land of the Highland Blackfaced, with its limit under 3800 feet. With the exception of a small extent of the limestone, this is altogether on the primitive rocks, and embraces every possible variety of the physical characteristics of the British Isles.

On taking a careful review of these different breeds and their associations, we may safely come to the general conclusion that well-proportioned and compact sheep (economically speaking) are from the best grazings and rich lands, or that they have been high-fed otherwise; and that those

with deep narrow chests are from poor pastures, where they have been bred and fed; and there are stages between these extremes. In the case of great poverty, such as some of the Welsh and Blackfaced, the fore-legs will be found almost to meet at the chest, with pinched-up flanks.

### 3. THE GENERAL ADAPTABILITY OF BRITAIN FOR SHEEP-FARMING.

A partial recapitulation will here be useful, for the purpose both of refreshing the memory, and, if possible, to draw a new suggestion.

From the weeds of the sea-shore to the lichens 4000 feet above them, there is a wonderful variety of all things—animal, vegetable, and mineral—in the nine degrees of latitude and eleven of longitude of these isles. Yet all is in a temperate zone. The altitude, soils, temperature, rainfall, and vegetation of this comparatively small portion of Europe are as remarkable as the history of the nation, and as locally variable as its scenery. There is no inhabited country in the world that has not felt Britain's influence in the promotion of its general rural economy, and that has not particularly benefited by its lessons in sheep-farming. This is no biassed eulogy on our own country, for all modern improvements in sheep are traceable to

Britain. This simple fact of itself is enough in proof of, and points to, her general adaptability for sheep-farming. The range of 4000 feet of elevation offers zones for the great variety of grasses, and contains soils and climate adapted to their special growth. These, accompanied as they are by corresponding states of arable husbandry, supply habitats for the extremes and mediums of sheep-life. The four distinct breeds described in this work may now be called unquestionable natives of the country.

While convinced of the general adaptability of Britain for sheep stock in its natural state, we have seen also that much, both of the suitability of the sheep's constitution, and the applicability of the several grazings to them, have been brought about by improvements. There has been an agreement of three points in this state of things—the natural disposition of the sheep previous to man's interference, and his keeping this up to the times in conformity with the altered circumstances of the country and cultivation, and the various zones of habitat, have all blended to make the present flocks of the nation. This is, however, strictly applicable only to England and Scotland, Ireland being as a whole still exceptional. This fine country, rich in soil and climate, is overflow-

ing with all varieties of pasture congenial to the growth of sheep, and it presents but a miserable show with such advantages. It is an example of wealth allowed to waste, a kind of unapplied sewage.

#### 4. THE EXAMINATION OF GRAZINGS FOR VALUATION.

It is not too much to say that management depends entirely on the breed, and the character of the ground; but it is too much to affirm that any examination, however minute, will enable, without previous intimate acquaintance, any one to decide as to the number and class of sheep which any particular grazing will best maintain. The party long in possession of a sheep-farm knows by an accumulation of circumstances—ordinarily called experience—so far how to economise the various conditions of his subject. In the majority of cases he has acquired the knowledge by practical facts often brought home to him—things which he could not overlook, because they appealed directly to the purse, for and against; but he exercised no other aids within his reach, he took no scientific note of the physical characteristics surrounding him, for the simple reason that he could not handle them as he would a sheep.

This error of separation between science and practice is still more common than many are willing to believe. The best judge of sheep and their belongings may not be the most successful grazier. The purely practical man cannot be prepared for emergencies, and able to take such an impartial and safe view of matters, as he who combines with practical knowledge a judicious use of the deductions of science. It is certainly safer, generally, to be guided by the former, but decidedly best to choose the combination.

With this introduction, let us see how an examination of grazings ought to be gone about; and we shall presume that the inquirer is totally unacquainted with the locality.

It is often the case that the residents are best conversant with what may be termed everybody's interest in the characteristics of the district of country in which the grazing is situated—such as the general rainfall and temperature; but should their information be meagre, the applicant must therefore have recourse to any special work on these subjects, or apply to the Meteorological Society, or personally at the station of observation, should any exist in the locality. Even when in possession of these figures—the mean, it may be, of ten years—he has to be most guarded in drawing



conclusions. Rainfall is so locally variable, that the very position of a hill, or change to masses of vegetation, makes an important difference in its amount, as also in the temperature. He should therefore have shrewdness enough to balance these circumstances—making allowance for or against rain-bringing causes. Temperature is not so capricious, and the observations of the nearest station will, in many cases, be a safe enough guide. The evidence of old inhabitants should, in the want of better authority, not be considered below the cautious notice of the expectant grazier, and from them, at least, will be got correct information as to prevalence of snow-storms, or other very prominent weather phenomena. Better than these should be the testimony of a disinterested shepherd—one who has spent his life on the ground, and who can describe every rill and hillock. A Government Survey sheet, to be got for 2s. 6d. in most cases, though not yet for the whole kingdom, will give an excellent idea of the locality, including altitudes and area. For his own satisfaction, and independence in making up calculations, these sheets should now be taken general advantage of; and to him who wishes to make a thorough examination, the Geological Survey will ere long offer further facilities. A particular personal inspection of the soils is a matter of great

importance also, and in hilly countries especially it is not uncommon to find quite distinct rock-formations, with their distinct soils, in the same valley. Here a flying visit, or mere bird's-eye view, might lead to serious disappointment, for the part to which he was taken by the steward or ground-officer, would naturally not be the worst; but another not distant brae-face or upland might turn out, after acceptance, to be much inferior.

Again, it ought surely to be worth the while of the party who makes his bread by them to become acquainted with those grasses most nutritious for sheep. Independently of self-interest, there should be a pride in being able to pick out, say a score of these grasses, for home reference, and discussion with friends. At any rate, the *present* farmer or grazier ought to be unsatisfied until his son, who is to follow him, is able to do so. All green ground is not wholesome pasture.

The general exposure of the district then comes under review; and in this he must, in great measure, be guided by inquiry, though an observant person can inform himself on this point by noticing the inclination of trees, and the nature of vegetation at dykes or rocks, and at banks of streams.

A practical eye can note many apparently

minor circumstances — such as that indigenous birch, oak, and hazel tell of good soils, and the rich soft dung of the sheep testifies to favourable grasses. Indeed, altogether, he who examines and values grazings, or any ground, either for himself or others, has to avoid the Russian proverb of “going through a forest and seeing no firewood.”

Along with these, and no doubt other memoranda, as determined by peculiarities of districts, there come the important subjects of the state of fencing, drainage, shelter, proportions of grass and heather to each other, and the condition of “burning” of the latter; as also houses and faulds. The practical man will put more stress on these than other items, and shape his valuation accordingly. The modern flockmaster is now undoubtedly realising the benefits of proper subdivisions—the fencing of his pastures into sections for the sake of undisturbed clean shifting. The existence or not of this on the ground under inspection, or its partial state, will influence the valuation materially; and, before making a visit, it is best that the lines of these fences be marked on the plan or government sheet. Knowing what number and kinds of stock it is proposed to keep, it will then be easy to calculate whether the existing

divisions are sufficient to accommodate these, it may be, according to more modern views of classification and herding.

Though probably difficult to secure, it is well to aim at, a variety of exposure and shelter in each of the divisions, together with good watering; for, though not direct water-drinkers, sheep love the herbage induced by brooks. The season of the year at the examination must rule the judgment in regard to the state of drainage; for a wet spring and dry autumn, after a long dry summer, will present very different conditions of surface. Here, then, is opportunity for the more scientific man giving a lesson to the other—the unchanged vegetable surface can at once decide the general or average condition of wet or dryness. The grasses, mosses, and other rougher plants, will unmistakeably tell the ruling state of soil and subsoil. It has to be considered how far drainage alone will improve the pasture, irrespective of burning or liming, and a corresponding value set for or against this. Even breaking up the surface for renewal or introduction of grasses may be advisable.

We have not yet reached the time when shelter receives the attention which it deserves. It is not special shelter that the greater number of the upland and hill grazings of this country

require ; not planting on particular sections only, but general distribution, to save long driving, and at the same time induce amelioration of climate.

It is understood that the party in search of a grazing will choose for himself the district of country, with its proximity to good roads and railway communication, before entering on any of the other points just sketched, and give them their due value.

Having thus made a satisfactory examination of the grazing for which it is proposed to offer, the actual valuation itself has yet to be made out, upon the faith both of the facts arrived at and the conditions of the lease. As these vary so much, it would serve no practical purpose to give an imaginary instance here.

## CONCLUDING REMARKS.

THOUGH I have thus endeavoured to sketch the existing position, principles, and practice of British sheep-farming as faithfully as lies in my power, there yet exist two or three difficult problems. There is little doubt that sheep being the agricultural subject which has the widest range, their ultimate state of perfection, in association with such variety of physical influences, is one of the most important and scientific problems of the present day. The questions connected with this are not special to sheep-growth, they are connected with the laws of other animal life as well as vegetation. I am not a believer in the time coming when all our heath-clad mountains, or even uplands, will be under cultivation; but it is not difficult to see how a change could be brought about in our climate so as to admit of great extension of improvements in hill pastures, whereby more equable temperature and increased and better food would easily double the present num-

ber of sheep. No doubt there are still lands capable of improvement without requiring any assistance by change of climate, but the *great field* is so situated. The day is coming when our lowland and upland sheep will be *housed* animals all winter and part of summer.

There is also too much indiscriminate breeding, too much running about for food, and altogether too much of a leaving-alone system of management.

When a few descents deteriorate the breed, more special tup-breeding must be established, with a "herd-book," as in the case of cattle and horses.

Then, the natural habits of the animal deserve greater attention than is generally given to it. Even the knowledge, for example, that sheep seek for fine pasture in the *morning*, and draw to the uplands or coarser ranges in the afternoon, would be valuable on many occasions.

Again, the production of the sexes has received almost no attention in this country. That there is a law dependent "on the greater or less relative vigour of the individuals coupled," is proved from many experiments specially conducted in France. For example, the produce of a strong ram and badly-fed ewes, or ewes too young and too aged, was more males than females, and *vice versa*. It has also been noted that when the ram is strong

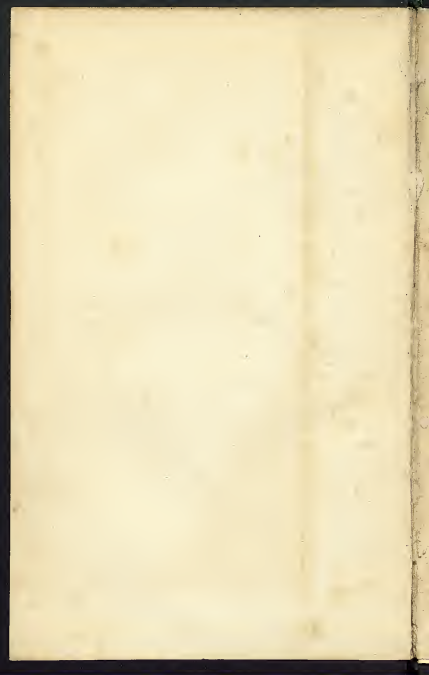
at the beginning of the rutting season, more males than females are brought. This subject is still, however, very imperfectly understood.

The great aim in sheep-farming is quick and early fattening, for which artificial food is indispensable. Turnips may now-a-days be termed "half artificial," as the use of so much other vegetable food makes them more the grounder than the finisher for the market. Variety and great extension of food is another of the problems to be solved.

Good sheep-farming is just this—to keep each class in circumstances throughout the year most conducive to breeding, feeding, and wool; giving the right kind of food at proper times, avoiding extremes, and generally to be guided by lessons from nature.

THE END.





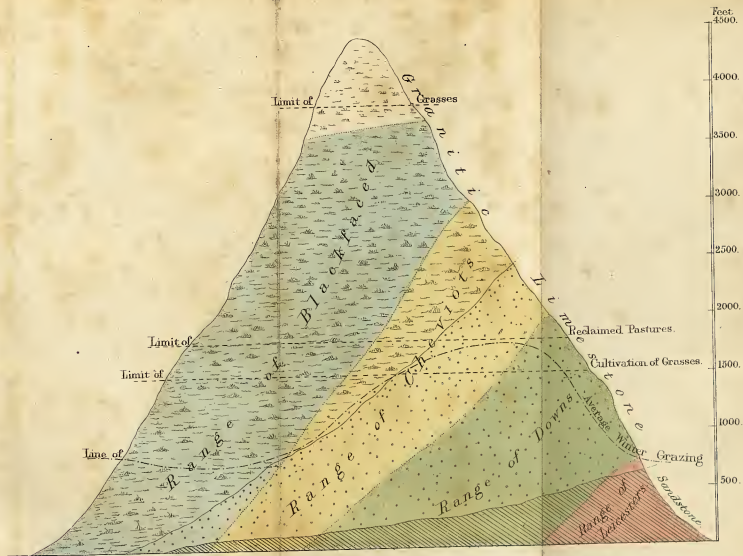
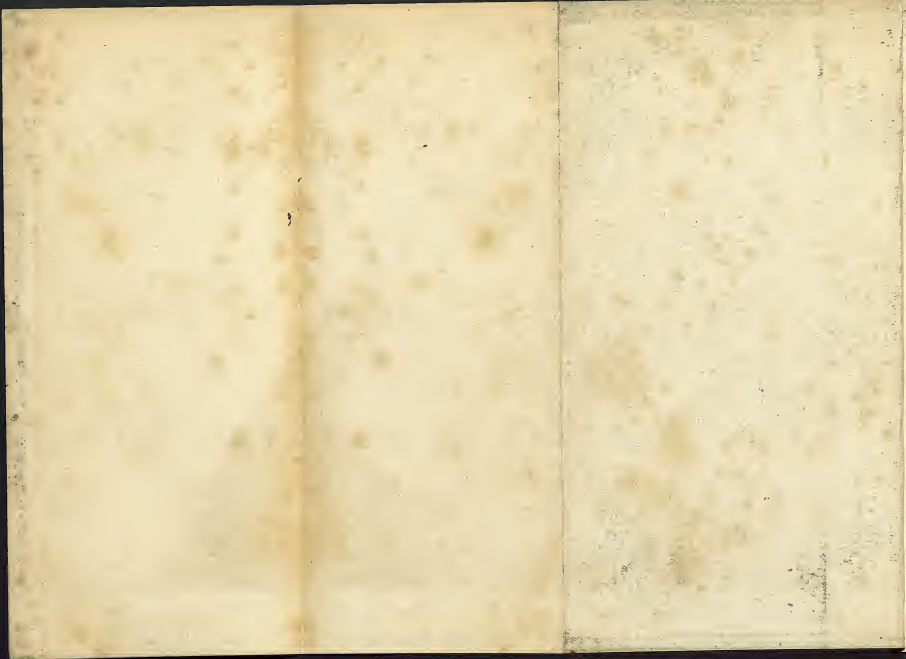
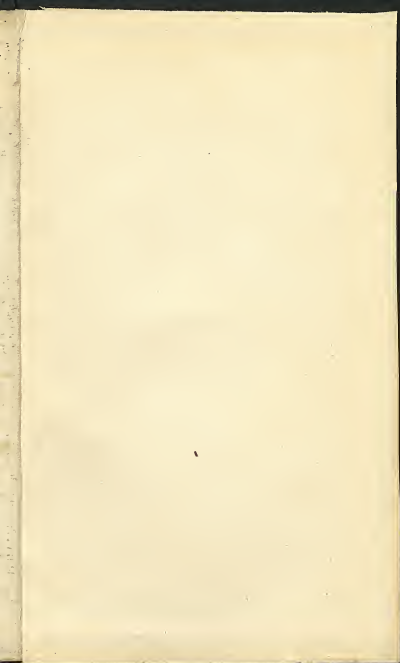


DIAGRAM SHOWING CHARACTERISTICS CONNECTED WITH SHEEP IN BRITAIN.



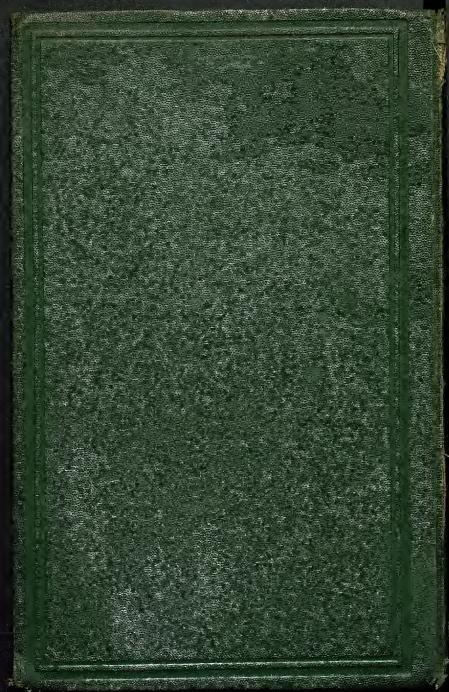


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